

## APPN may hold key to SNA/LAN integration

Will be great equalizer for some companies.

Last in a four-part series on SNA/LAN integration.

BY MAUREEN MOLLOY

With router vendors' growing acceptance of Advanced Peer-to-Peer Networking (APPN) — the so-called new SNA — users are opening up to the

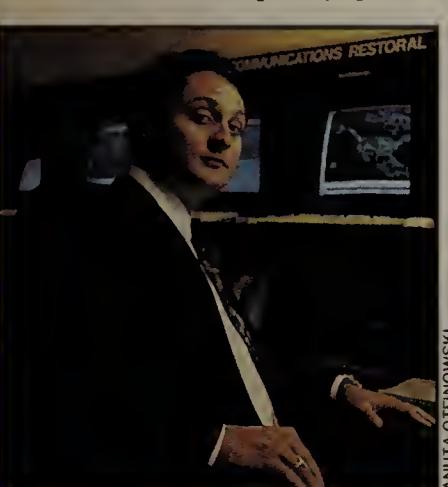
idea of mixing lifeblood data with local-area network traffic on a single multi-protocol backbone.

While some companies have opted to integrate Systems Network Architecture and LAN traffic by encapsulating SNA in TCP/IP and others are passing LAN traffic across SNA nets, the routable APPN may emerge as a solution to support virtually any kind of traffic.

APPN is a strategic IBM technology that allows SNA devices to communicate as peers without mainframe intervention. It provides a means for routers to pass SNA data across a multiprotocol backbone without relying on makeshift techniques such as source route bridging or Transmission Control Protocol/Internet Protocol encapsulation.

But that isn't to say APPN will take the world by storm. Most users are still divided about the APPN question (see graphic, page 118). And the router ven-

See SNA, page 118



John Bruno of UPS

DANUTA OTNIEWSKI

## Separating fact from fiction

BY ROBERT CHRISTIAN

**T**raditional, surefire approaches to solving business problems just won't cut it anymore.

In *Reengineering the Corporation*, authors Michael Hammer and James Champy point out example upon example of companies floundering under outdated methods of work.

The book illustrates the exploits of one unidentified manufacturer that prided itself on quick order fulfillment. However, it took the company 11 days to process a rush order, largely because the warehouse and a distribution facility couldn't coordinate orders even though they were in the same building. No wonder companies are rethinking their work processes and redesigning their underlying information delivery systems.

Information is being distributed to end users closest to customers, suppliers and other business partners, where it is needed to support decision making in today's business markets.

As corporations remodel their decision-making processes, many are forced to rethink traditional computing models, as well, and that's why the phenomenon called client/server computing has garnered so much attention.



Continued on page 80

## IBM at work on object-oriented work flow management system

BY BOB BROWN AND WAYNE ECKERSON

Boblingen, Germany

IBM is readying an object-oriented work flow management system that will tie together diverse applications and position IBM for a leadership role in the emerging work flow market.

The product will include a design component that helps developers build work flow applications and an underlying run-time component — or work flow engine — that maintains work flow procedures in object form. The engine will also enable work flow applications built with those procedures to run across diverse machines and databases, an IBM official said

in a briefing here last week.

The work flow system would serve as a common platform for integrating IBM and non-IBM products and work flow tools, including IBM's ImagePlus imaging systems and Lotus Development Corp.'s Lotus Notes. The system, being developed by IBM Programming Systems here, is expected to be delivered first on OS/2 and later offered for AIX and machines ranging from desktop systems to mainframes.

IBM declined to specify exact product plans, saying the work flow system is still under development and could take any number of shapes as a commercial

See Work flow, page 118

### INTEROP 93 AUGUST

## ATM will be the hit of the show

Fore to broaden market reach through partnerships, new products.

BY SKIP MACASKILL

San Francisco

ATM market leader Fore Systems, Inc. will unveil at the INTEROP trade show here this week a suite of new Asynchronous Transfer Mode workstation adapter cards and what it claims is the industry's first 155M bit/sec ATM interface.

The company will also announce two strategic partnerships, teaming up with 3Com Corp. to package its ATM switches for sale with 3Com hubs and routers and Sprint Corp. to push wide-area ATM nets (see adjacent story).

"With these announcements, we're expanding into different areas of the market," said Mark Juliano, director of product marketing.

See Fore, page 115

### Pricing plummet



By 1995, Fore's Asynchronous Transfer Mode adapter cards for copper media are expected to cost \$500 and switch prices will come in at well under \$2,000 per port.

SOURCE: FORE SYSTEMS, INC., PITTSBURGH

Sprint, WilTel to air ATM service plans.

BY BOB WALLACE

San Francisco

Sprint Corp. and WilTel will use the INTEROP 93 August conference here as a backdrop for the official unveiling of their Asynchronous Transfer Mode (ATM) network services.

Sprint will become the first of the top three long-haul carriers to announce immediate availability of an ATM service, while WilTel is expected to detail broad ATM deployment plans.

The announcements come just weeks after MFS Datanet, Inc. brought a nationwide ATM net on-line. MFS Datanet is a unit of competitive access provider MFS Communications, Inc.

The moves will put Sprint and WilTel atop the list of long-haul carriers of

See Sprint, page 115

## Novell readies raft of new features for UnixWare

BY CARYN GILLOOLY

San Jose, Calif.

Novell, Inc.'s Univel subsidiary is planning a make-over of UnixWare that will tie the operating system tightly to NetWare 4.X, incorporate TCP/IP support and provide symmetric multiprocessing capabilities.

Sources briefed by Novell said Univel plans to bring out by the end of this quarter a new version of UnixWare Personal Edition and UnixWare Application Server that can access the directory, security, management and other services provided by NetWare 4.01. The current UnixWare is only compatible with NetWare 3.11.

UnixWare Personal Edition 1.1 will also have built-in support for the Transmission Control Protocol/Internet Protocol. The current release uses Novell's Internetwork Packet Exchange (IPX) transport protocol, with TCP/IP support pro-

See UnixWare, page 118

### INSIDE NEWS

● AT&T advances its vision of the future with \$12.6 billion buyout of McCaw Cellular. See the Global Services section.

● Test uncovers problem in bridging NetWare traffic from token ring to FDDI. See the Local Networks section.

# Briefs

**APPN alternative.** Wellfleet Communications, Inc. will announce Tuesday that it is the first vendor to license Advanced Peer-to-Peer Networking (APPN) Network Node (NN) software from Data Connection, Ltd. (DCL). Last March, DCL announced the first non-IBM developed APPN NN software for equipment manufacturers. Wellfleet said it will implement the code in its routers for delivery in late 1994. DCL plans to add dependent LU Requestor (dLUR) and Data Link Switching (DLSw) support to its SNAP-APPN offering. dLUR lets 3270 data traverse APPN nets, and DLSw lets Systems Network Architecture and Network Basic I/O Systems data traverse Transmission Control Protocol/Internet Protocol nets.

**Blue note.** IBM and Digital Equipment Corp. are expected this week to announce an agreement under which IBM's NetView/6000 management system will be ported to DEC's Alpha hardware, and NV/6000 functionality will be incorporated into DEC's Polycenter management product. Observers also speculate that DEC may also resell a NetView/6000 variant. DEC declined to comment, and IBM did not respond by press time.

**Bosom buddies.** Banyan Systems, Inc. and Oracle Corp. announced availability of the Oracle7 database for Banyan's VINES for SCO Unix at The Santa Cruz Operation, Inc. (SCO) forum in Santa Cruz, Calif. A new Oracle SQL\*Net driver will be integrated into Banyan's StreetTalk III directory service to let users access Oracle7 on a VINES for SCO Unix server. The driver will be sold through Oracle.

**Wiring hub goes wireless...** Optical Data Systems, Inc. (ODS) this week will announce wireless Ethernet capabilities for its hubs through an alliance that lets ODS resell Windata, Inc.'s FreePort Wireless Ethernet LAN System, which provides wireless connectivity within buildings at distances up to 260 feet.

**...As group pursues wireless standard.** More than 40 leading vendors, including AT&T, Digital Equipment Corp., Motorola, Inc. and NCR Corp., last week formed the InfraRed Data Association, which will develop a standard for connectivity between mobile and desktop computers and other peripherals using infrared links.

**ATM tango.** National Semiconductor Corp. and Network Equipment Technologies, Inc. (NET) have signed an agreement that gives National Semiconductor access to NET's Asynchronous Transfer Mode (ATM) local-area net emulation and signaling software, which National will use to develop ATM products. The firms also announced sample availability of an ATM adapter for Extended Industry Standard Architecture bus machines, ranging in speed from 45M bit/sec to 155M bit/sec. It will be generally available by year end.

**SMDS advances.** Bell Atlantic Corp. has filed pricing for Switched Multimegabit Data Service links from its central offices to long-haul networks, which could pave the way for end-to-end SMDS offerings from interexchange carriers. Also, AT&T Network Systems this week will announce the BNS-MicroSwitch. Carriers can use this to offer access to SMDS at lower than T-1 speeds, making it easier for users to add sites onto an SMDS net that cannot cost-justify T-1 access.

**Hi MOM.** The Message-Oriented Middleware (MOM) group will hold a Birds-of-a-Feather session at INTEROP 93 on Thursday at 9:30 a.m. The group is seeking input on its mission to enhance awareness about the role of interprocess messaging software in distributed applications. MOM was formed in May by seven vendors: Covia Technologies, Inc., Digital Equipment Corp., Horizon Strategies, Inc., IBM, Momentum Corp., PeerLogic, Inc. and Systems Strategies, Inc.

## Contacts

ADDRESS: Network World, 161 Worcester Rd., Framingham, MA 01701. PHONE: (508) 875-6400; FAX: (508) 820-3467; INTERNET: network@world.std.com.; BBS: Interact with other readers: download free software, submit letters to the editor, leave news tips, change of address requests or hunt for jobs by using your IBM, Apple or other computer to dial into the BBS at 300 to 2,400 bit/sec [8N1] at (508) 620-1160 or at speeds up to 9.6K bit/sec by dialing (508) 620-1178. READER ADVOCACY FORCE (R.A.F.) HOTLINE: Contact us with story tips about pressing user issues, (800) 622-1108, Ext. 487; NETWORK HELP DESK: Contact Susan Collins via any of the above means.

## Network **HELP** desk

Network World tracks down answers to your questions regarding products, services, technologies or disputes with vendors. Please submit questions to Susan Collins at (800) 622-1108, via fax at (508) 820-3467 or via the Internet at scollins@world.std.com.

**We are considering setting up dial-in (remote) access to our Novell, Inc. local-area network. Are there any hardware devices available that implement a "lock and key" approach for dial-in security? Dial-back would not work because there may be people on the road.**

**Arthur Gurevitch, New York**

*Robert Bales, executive director of the National Computer Security Association, a membership organization dealing in computer security education in Carlisle, Pa., replies:*

*One approach gaining wide acceptance is dynamic password generation. The user carries a small (credit card-size) device that generates a one-time password. This password is then used during logon to the remote host.*

*This ensures that the individual gaining access*

*is actually in possession of the device. Typical host security should provide that added layer of routine user identification/password protection.*

*There are several dynamic password-generation products on the market that are worth reviewing, such as SecureNet Key from Digital Pathways, Inc., SafeWord PC-Safe II from Enigma Logic, Inc., Info-Card from LeeMah DataCom Security Corp. and SecurID Card from Security Dynamics, Inc.*

*For product information, call Digital Pathways at (415) 964-0707, Enigma Logic at (510) 827-5707, LeeMah DataCom Security at (800) 992-0020 and Security Dynamics at (617) 547-7820.*

*For more information on these and other dial-in security products, see Mark Gibbs' article "Dialing for data" in the May 31 issue of Network World (page 51).*

**Do you know of a gateway between Da Vinci Systems Corp.'s Da Vinci eMail and Banyan Systems, Inc.'s VINESMail?**

**Bill Glennon, Los Angeles**

*See Help desk, page 87*

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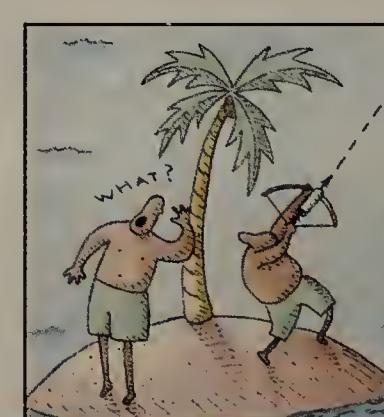
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# Start-ups offer innovative management tools

*Arkhon integrates technologies to ease control over client/server nets.*

BY JIM DUFFY

Cerritos, Calif.

A start-up company this week will announce plans to develop software that coordinates the efforts of several management tools to ease control of client/server networks.

Arkhon Technologies, Inc. will take a bow at the INTEROP '93 August show in San Francisco. The company, based here, was established by former executives from MVS Software, Inc. and Bank of America who have tackled systems management projects for their respective customers and employers.

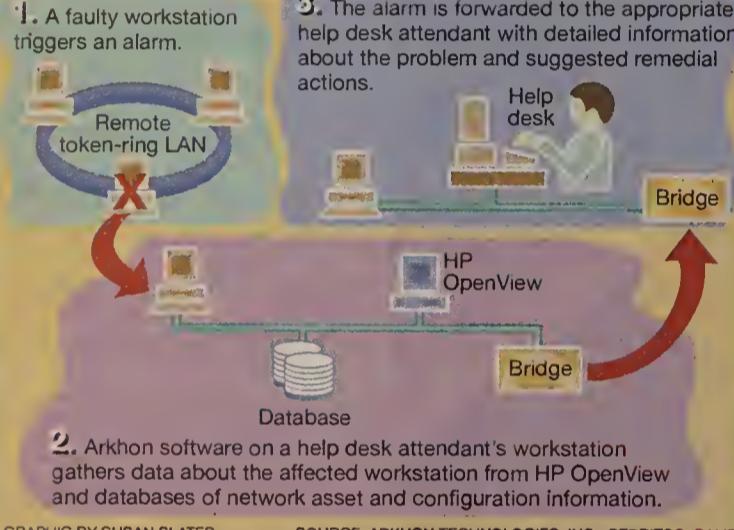
bility for making all of the coordination [between products] happen under the covers."

Initially, the Arkhon software will run on DOS, Windows and Macintosh clients as well as Sun Microsystems, Inc. SPARC-station servers in a Transmission Control Protocol/Internet Protocol network.

When a problem arises, the Arkhon system will field the alarm and, using its AI engine, assess the cause and suggest remedies. If the problem is common, the system can kick off script files that launch a fix.

If the problem is more com-

## Hunting and gathering



GRAPHIC BY SUSAN SLATER

SOURCE: ARKHON TECHNOLOGIES, INC., CERRITOS, CALIF.

Arkhon is developing software that integrates a Simple Network Management Protocol manager with a protocol analyzer, an artificial intelligence engine, the Object Management Group's Object Request Broker (ORB), a trouble-ticketing system, a network design and modeling tool, as well as a data repository to help users automate management of distributed networks.

The unnamed software is intended to give net managers and help desk attendants a consistent method for automating management of their client/server environments.

Arkhon is the latest start-up to target the nascent market of client/server network and systems management. Others include EcoSystems Software, Inc., Emprise Technologies, Inc., OpenVision and Patrol Software, Inc.

"What we are providing is middleware that lets the user be virtually isolated from the underlying products," said Jim Overby, director of software development for Arkhon. "The user just makes requests for services and sees the result of those services. We take the responsi-

plicated, the Arkhon system can order the protocol analyzer to collect diagnostic information on the local-area network segment where the alarm originated.

It can also employ the ORB to gather other information about the device from databases throughout the network.

Once the Arkhon system has culled the information, the AI facilities can suggest solutions to the problem. The Arkhon software will then populate a trouble ticket with the data and route it to the appropriate network administrator.

When the problem is fixed and the trouble ticket closed, the system will store the trouble ticket information in any network database the administrator chooses, including those used with popular management systems such as Hewlett-Packard Co.'s OpenView.

The Arkhon software will be generally available in the first half of 1994. Pricing will be disclosed at that time.

The software will work with technology from vendors such as CACI Products Co., Inference Corp., Network Manag-

See Start-up, page 113

*Enterprise Systems' software gives more control over SNA networks.*

BY MICHAEL COONEY

Marina del Rey, Calif.

SNA users can achieve end-to-end management of their networks and gain real-time views of SNA sessions, links and devices with new software from Enterprise Systems Software Corp.

The start-up, made up of ex-IBM NetView programmers, this week will announce Net/Overview, an extension to IBM's mainframe-based NetView network management platform that will determine the cause of Systems Network Architecture equipment failures and notify operators of the potential severity of problems.

"Today, the first indication of an SNA network performance problem or device failure is [often] a call from an irate user," said John O'Brien, product author for Enterprise Systems Software. "The NetView network management personnel have no idea what caused the problem or any way of telling how many other users the problem has affected."

The Net/Overview application resides alongside NetView on the mainframe. It monitors SNA traffic coming through VTAM and NetView's Hardware and Session Monitor applications, which gather errors reported by front-end processors (FEP), controllers, modems and other devices. VTAM controls all SNA data flowing to and from the SNA host.

## BUILDING A MAP

Once installed, Net/Overview uses the VTAM and NetView data to create a topology map of all network devices, links and session paths, including individual links between controllers and FEPs or local-area network connections to the host. Net/Overview stores the topology map in a mainframe virtual storage file. No user pre-definition of the net is required.

Once the map is created, Net/Overview monitors network status and session activity between links, captures net changes and automatically refreshes the map.

The topology map and any other data Net/Overview captures can be displayed on a traditional NetView 3270 screen or on a mainframe-attached DOS or OS/2-based personal computer running Microsoft Corp.'s Excel spreadsheet.

When Net/Overview detects an SNA device failure or a devi-

ation from a user-set performance threshold, it highlights the condition by changing the color of an icon on a system monitor. It then issues a report identifying the network failure by component and the actual number of users affected by the failure. In addition, it has the capability to open and close trouble tickets in IBM's Information/Management net management database.

For example, a 3745 scanner that controls the communications lines coming out of the FEP could fail and lose hundreds of users. Those users would flood the network and NetView with alerts, making it nearly impossible for the NetView operator to tell where the problem is.

With Net/Overview's real-time monitoring capabilities, however, the operator would be able to spot the problem in minutes, rather than the hours or sometimes days it takes using NetView alone, O'Brien said.

## FEAR OF FAILURE

"Depending on the application, the cost of a failure can be hundreds of thousands of dollars per hour," he said. "Quicker reaction time equals better on-line services and improved network operations."

Lionel Geltman, assistant vice president of Nomura Research America in New York, which has tested Net/Overview, praised the product.

"We have such big pipes with so much data running through them, it's hard to get details on everything," he said. "But the Net/Overview product will solve that problem and give us details about our SNA net we just couldn't get from NetView before. It definitely fills in some of the cracks in NetView."

"The ability to automatically gather SNA topology data and manage the SNA net in real time is a unique feature and makes Net/Overview a powerful addition to NetView," said Donald Czubek, president of the Gen2 Ventures consultancy in Saratoga, Calif. "The product will also be useful to SNA users because it doesn't propose to eliminate NetView, but rather to extend its functions."

Net/Overview will be available by the end of the year for prices ranging from \$30,500 to \$87,000, depending on mainframe processor size.

©Enterprise Software: (310) 305-7721.

# IBM to unveil DCE for OS/2 at INTEROP

BY CHRISTINE BURNS

San Francisco

IBM this week will continue widening its support for the Open Software Foundation, Inc.'s (OSF) Distributed Computing Environment (DCE) with the announcement of DCE client support for its OS/2 operating system.

The DCE client will enable OS/2-based personal computers to access applications and files on other DCE-ready machines across an enterprise network.

IBM will also release a developers' kit for OS/2 servers that lets programmers at Windows and OS/2 workstations collaborate in DCE application development.

"We're the first in the industry to put DCE on an Intel machine. What that brings to the IBM PC-compatible marketplace is openness, customer choice, flexibility and downsizing strength," said Art Olbert, president of IBM's Personal Software Products Division.

DCE includes security, directory, remote procedure call, synchronized timing and distributed file services pulled together by OSF to help users build distributed computing systems.

Delivery of DCE support for OS/2 clients brings IBM one step closer to its goal of implementing DCE on all of its major operating systems.

IBM last December delivered base DCE services on its Unix-based AIX platform, which it upgraded in July by adding distributed file service support, thereby providing users with transparent access to files located anywhere on the network.

IBM has said DCE services for its LAN Server network operating system and DCE client support for Windows are not far behind.

Walt Dymek, an analyst at the Delran, N.J.-based consultancy Datapro Information Server Group, said open systems support is key to IBM's future. "It's about time for IBM to finally move away from its proprietary environment and toward the open systems that end users are demanding," he said.

## TWO-PHASE DELIVERY

DCE services for the OS/2 platform will be delivered in two phases. IBM is offering an add-on product, available now, containing the base DCE services: remote procedure call, security, directory and timing, or synchronization and services.

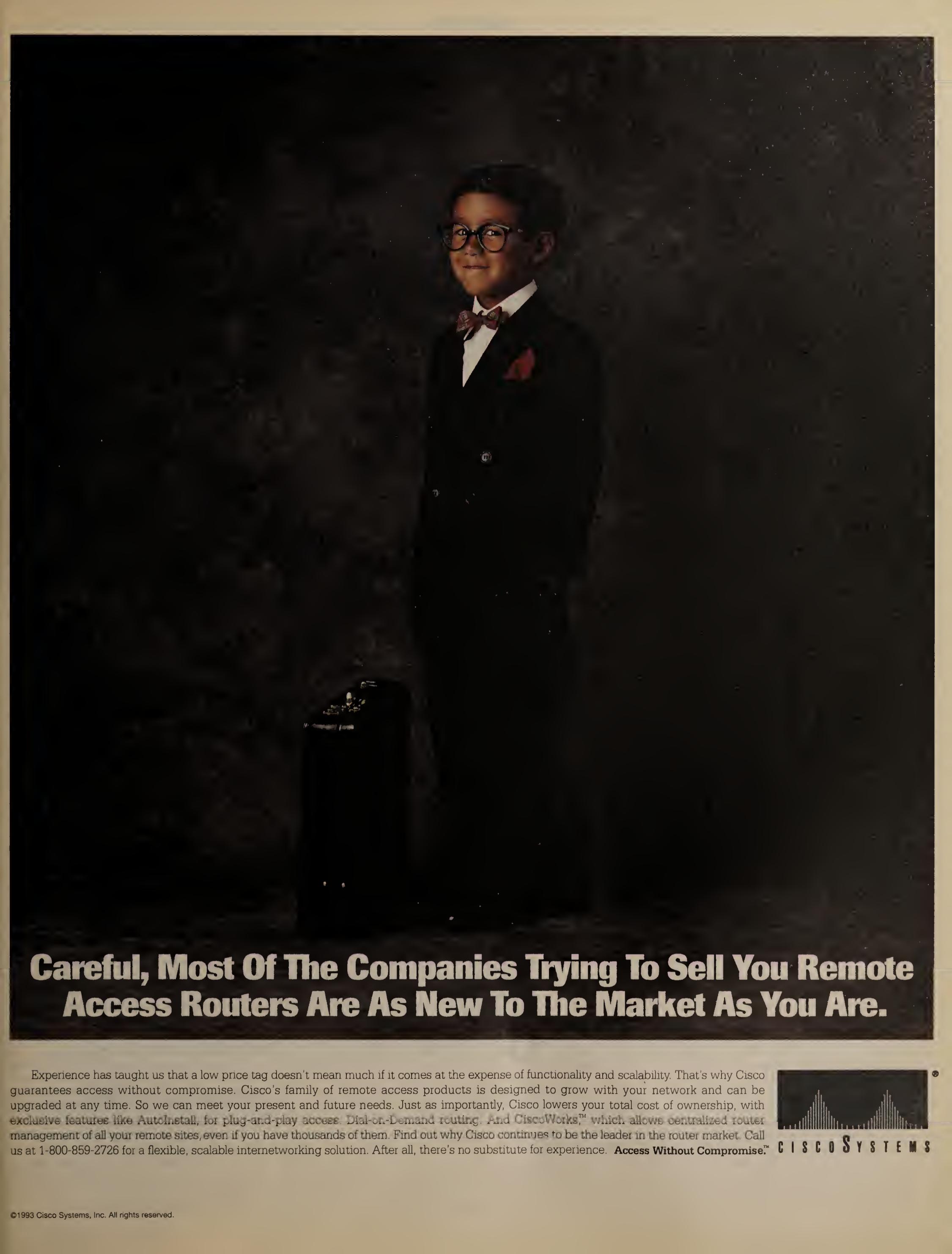
These services work together to help users find and access resources on the network. The base DCE product for OS/2 costs about \$150 per client. IBM will ship an upgrade of DCE for OS/2 that includes distributed file service support within six months, according to Olbert.

IBM is also now shipping a DCE software developers' kit for OS/2 servers that supports base DCE functions and enables as many as 10 programmers on Windows and OS/2 clients to work together to build distributed applications.

"The thrust here is that DCE allows users to turn the LAN into a robust, industrial-strength platform for building applications because it gives them the opportunity to enforce security, keep track of time and access information anywhere," Olbert said.

According to Olbert, the price of the developers' kit has not been set, but he expects it to cost between \$2,500 and \$3,000.

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# E-mail users voice concern about pending legislation

BY BOB BROWN

The Electronic Mail Association (EMA) is scurrying to respond to broadly worded legislation moving through Congress that it claims could have a chilling effect on E-mail usage.

The legislation was originally drafted to prevent telephone companies and telemarketing firms from monitoring the telephone calls of operators and telemarketers, and was later revised to curb snooping on employees via video cameras.

But recent revisions expand the scope of the legislation to cover all kinds of computer communications, including E-mail and voice mail.

According to members of the E-mail community, the legislation could strip employers of any right to monitor employee computer files, E-mail or voice mail, even in emergency situations.

The legislation drew fire from a caller to *Network World's* Reader Advocacy Force (R.A.F.) hot line. "I'm very concerned about the impact the bill could have on E-mail management and usage," said the network manager, who asked not to be named. "The bill was drafted as labor legislation, and it appears it was drafted by people who don't understand the issues involved with electronic offices. Electronic monitoring is defined very broadly here."



CAVANAGH

According to a memo issued by EMA Executive Director Bill Moroney to members of the user/vendor group earlier this month, the legislation "could cripple the electronic messaging business."

"[This] legislation would remove virtually all employer rights to determine employee privacy rights with regard to any aspect of computer communications," the memo stated. "It would also profoundly change the elements of computerized control that management can have over its own business operations with respect to safety, quality and efficiency."

In the memo, Moroney asked for help in establishing a formal EMA response to the legislation.

H.R. 1900 was introduced in the House of Representatives by Rep. Pat Williams (D-Mont.) in April, and the nearly identical Senate companion bill, S. 984, was introduced by Sen. Paul Simon (D-Ill.). A House subcommittee has been assigned to getting the bill to the full House Education & Labor Committee by mid-September. The Senate committee has not announced its plans.

Former EMA Executive Director Mike Cavanagh, now president of consultancy Cavanagh Associates, Inc. in Arlington, Va., said Moroney is not being melodramatic. The wording in the legislation invites broad interpretations of E-mail, said Cavanagh, who recently hosted a seminar in Washington.

ton, D.C. on E-mail privacy and high-tech workplace policies.

Under the current legislation, it would be illegal for an employer to access an employee's E-mailbox — even in an emergency situation — without the employee's consent, Cavanagh said.

For example, a newspaper that is working on a major story could be prevented from including some key information in the article because it was stored in a reporter's E-mail system and the reporter was unreachable.

Don Gilbert, director of information systems at the American Petroleum Institute, a Washington, D.C. trade association for oil companies, called the legislation "scary."

Depending on how one interprets the "loosely written" bills, the use of electronic data interchange could be threatened, he said. It might be deemed illegal for a purchase order sent via EDI to be picked up by someone other than the intended recipient, even though the message may really be intended for anyone in the company's customer accounts department.

Several E-mail service providers, including AT&T and MCI Communications Corp., have examined the legislation. AT&T dubbed it "overkill," a position that stems largely from the carrier's objection to the bill's original intention of barring employers from electronically monitoring workers, a company spokesman said.

Both AT&T and MCI are still formulating stances on the E-mail aspect of the legislation.

Analysts said E-mail administrators and net managers should review the legislation with corporate legal departments.

©EMA: (703) 875-8620.

## NETWORK MANAGEMENT

# Motorola Codex adopts HP OpenView

BY JIM DUFFY

Mansfield, Mass.

Falling in line with its network brethren, Motorola Codex last week brought out a network management system that's based on Hewlett-Packard Co.'s OpenView platform.

Motorola Codex is only the latest wide-area network equipment vendor to adopt the popular HP product as a management platform. Other recent converts include Network Equipment Technologies, Inc. and Gandalf Systems Corp. Ascom Timeplex, Inc. is also expected to embrace OpenView.

Motorola Codex's new 9000-UX Open Management System will provide management of the vendor's modems, multiplexers, data service units/channel service units, switches and local-area network internetworking devices.

The 9000-UX system will also manage third-party equipment that supports the Simple Network Management Protocol.

In adopting HP's OpenView as its strategic management platform for the future, Motorola Codex has acknowledged that its own 9800 Series Network Management System is nearing the end of its life cycle.

Introduced in 1987, the 9800 is an Open Systems Interconnection-based management offering for Motorola Codex and third-party gear that runs on HP Apollo workstations and is installed at some 300 sites.

Ed Reynolds, director of worldwide product marketing for network management at Motorola Codex, said the company will continue 9800 development for at least the next 12 to 18 months, but new products — such as Motorola Codex's 6520 Multimedia Periphery Router, which also debuted last week (*NW*, Aug. 16, page 1) — will be managed only from the 9000-UX.

"We have not put an 'end of the road' on 9800 development in our plans yet," Reynolds said. "We will continue to support the customers and products that are on the old management system. But for the most part, our development will be focused [on the 9000-UX]."

Reynolds said Motorola Codex has implemented a migration path from the 9800 to the new 9000-UX system. That path includes the ability to monitor older Motorola Codex equipment from the 9000-UX via proxy agents.

Management applications developed for the 9800, however, will not be portable to the 9000-UX, Reynolds said, because the systems run under different operating systems. Users and Motorola Codex will have to rewrite 9800 applications to run on the 9000-UX, he said. The company has already rewritten some of those applications for customers already using HP's OpenView.

Motorola Codex chose OpenView for its management platform due to its popularity among application developers.

Analysts believe Motorola Codex chose OpenView to boost sales of its networking gear.

"The only way to make sure that they can maximize their hardware penetration is to be able to sell into the management systems their customers already have," said Christopher Baum, senior analyst at DataPro Information Services Group in Delran, N.J.

The 9000-UX Open Management System will be available by the end of the year. It will range in price from \$20,000 to \$60,000. Motorola Codex management applications to run on installed OpenView systems are available starting at \$2,500.

©Motorola Codex: (508) 261-4000.

# Retix routers will anchor McCaw data network

Infrastructure is OSI-based but supports TCP/IP.

BY ELLEN MESSMER

Santa Monica, Calif.

McCaw Cellular Communications, Inc. has picked Retix to supply a new type of router called the Mobile Data-Intermediate System (MD-IS) for McCaw's nationwide Cellular Digital Packet Data (CDPD) network.

McCaw began deploying the CDPD equipment in its network this month, with beta tests of the 19.2Kbit/sec cellular packet service expected to begin around October in Las Vegas. McCaw plans to support CDPD, which works over cellular channels using a frequency-hopping technology developed by IBM, throughout its network by mid-1994.

The Retix CDPD routers — as well as other equipment McCaw is buying, such as mobile database stations from both Pacific Communication Sciences, Inc. and Steinbrecher Corp. — conform to the CDPD industry specification finalized last month.

"The CDPD specification starts out with a goal that all the applications at the end system should be able to operate without changing them," said John Reidy, product-line manager at Retix.

CDPD routers are designed to support Open Systems Interconnection and the

Transmission Control Protocol/Internet Protocol.

"CDPD supports routing of Connectionless Network Protocol and IP traffic," said Rob Mechaley, senior vice president and general manager of the wireless data division at McCaw. But the CDPD specification is flexible enough to support multiple protocols so more could be added later.

In the future, users will use laptops or personal communicators equipped with CDPD modems to send data over cellular frequencies.

Cincinnati Microwave, Inc., Cirrus Logic, Inc., IBM, Motorola, Inc. and Sierra Semiconductor Corp. have all announced plans for CDPD modem chipsets or devices. In addition to McCaw, nine other cellular service providers — mostly the Bell companies — plan to provide CDPD services.

As envisioned, CDPD data would be picked up over the airwaves at the nearest CDPD provider's cell site anywhere in the country. There the radio signals would be modified into land-line CDPD data format by the base station, which would hand it off to one component of the Retix mobile router,



REIDY

the "serving" MD-IS.

That device would send data into the land-line backbone network in search of the "home" router.

The home router, maintained by the CDPD subscriber's own provider, would house subscriber information. It would also handle verification of the subscriber's services and billing information before sending the CDPD packets off to their final destination.

The CDPD specification is based largely on OSI standards, Reidy said. The lookup directories are based on X.500, while network management is based on the OSI Common Management Information Protocol (CMIP).

Retix will also supply X.400, X.500 and CMIP software to McCaw for CDPD.

Retix is currently the only CDPD router vendor, analysts said. "No one else has stood up to say they're going to build a CDPD router," said Paul Callahan, senior analyst at Cambridge, Mass.-based Forrester Research, Inc.

But McCaw's Mechaley said his discussions with vendors have assured him there will be other providers of CDPD routers in the coming year.

For CDPD, the key question is whether its mobile IP service will be able to serve as the "on ramp for the Internet," Callahan said. "Can [CDPD services] scale up for millions of users?" he asked. "Can they help the cellular industry, which has been so fragmented, mature?" □

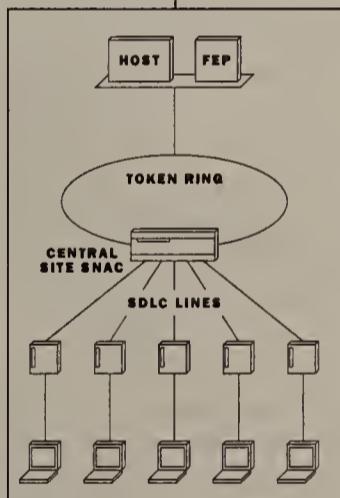
# "SYNC'S CENTRAL SITE SNA CONVERSION SAVED \$[REDACTED] FOR US AT [REDACTED], BUT YOU DIDN'T HEAR IT FROM ME."

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"We've got our SNA network centered in [REDACTED] and remote LANs in [REDACTED] and [REDACTED]. Adding front-end processors would've meant financial bloodshed to the tune of \$[REDACTED] out of the box, plus an extra \$[REDACTED] in service contracts."

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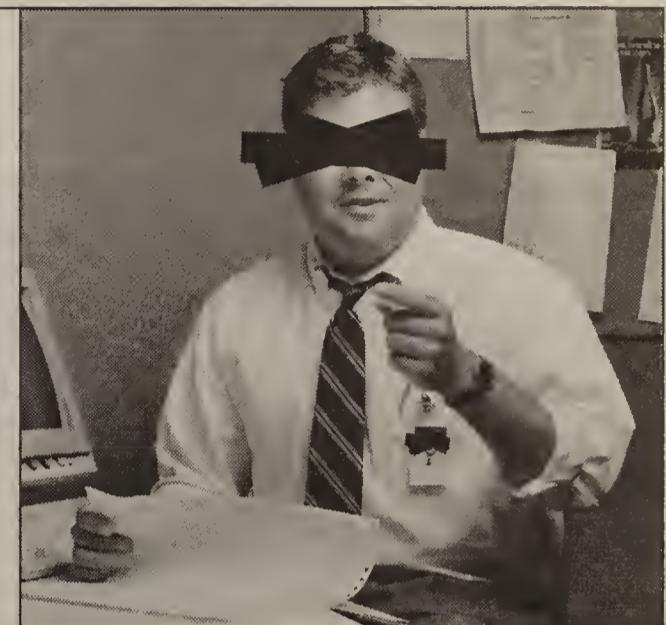
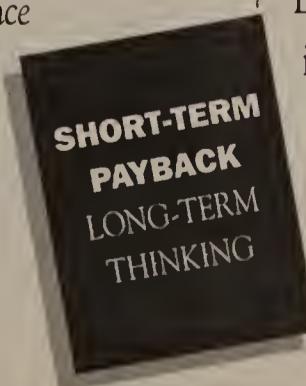


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**SYNC RESEARCH**

INTERNETWORKING SNA

# Novell and SynOptics pair NetWare with hub

BY SKIP MACASKILL  
AND CARYN GILLOOLY

San Francisco

SynOptics Communications, Inc. and Novell, Inc. will bring their worlds closer together this week with a product development agreement that will more tightly integrate Syn-

Optics' hub with NetWare.

To be announced at the INTEROP 93 trade show here, the partnership is expected to call for the companies to collaborate on the development of a hardware module that will enable SynOptics' LattisNet System 3000 hub to support a Runtime version of NetWare.

The module will essentially turn the hub into a NetWare server and let users load NetWare Loadable Modules (NLM). The companies are also expected to announce that the first NLM to be bundled with the module will be Novell's NetWare MultiProtocol Router (MPR).

Other NLMs could also be added to the module, which will possibly be dubbed the LattisWare Application Engine.

In the future, for example, SynOptics could add Novell's remote access NLMs as well as hooks into Novell's NetWare Management System, which would let an administrator manage

the hub from a central console elsewhere on a NetWare local-area network.

"Novell has a large installed base and is firmly imbedded in the lower to middle ends of the market, and SynOptics wants to penetrate those NetWare environments with its hub lines," said Todd Dages, vice president of data communications at The Yankee Group, a consulting firm in Boston. "To do that, it needs a real low-cost routing solution, and Novell's MPR provides that entry."

This agreement is expected to be similar to the one Novell made with both Ungermann-Bass, Inc. and NetWorth, Inc. in May of last year (NW, May 11, 1992, page 1), under which Runtime was integrated into UB's Access/Open hub extension and NetWorth's System 4000 hub.

"This is similar to what NetWorth is trying to do with its NetWare Application Engine, but, unfortunately, it didn't have the wherewithal and muscle to make it catch on," said Charlie Robbins, director of communications research at Aberdeen Group, Inc., a consultancy in Boston.

"SynOptics, however, does have the muscle through its distribution system to pull this thing together," Robbins said.

Analysts saw the Novell relationship as another move by SynOptics to distance itself from router vendor Cisco Systems, Inc., who SynOptics has worked with extensively in the past.

"There are a number of hub vendors besides SynOptics who have been tightly coupled with Cisco that are moving away from them, including Cabletron [Systems, Inc.] and Chipcom [Corp.]," Dages said. "Those companies have found that the relationships weren't that fruitful, and they see Cisco as a potential competitor down the road."

"With Novell," he continued, "SynOptics gets a brand name — the company with the lion's share of the network operating system market, entry into the NetWare community and low-cost work group routing capabilities."

If SynOptics [tried to go] with Cisco [to address the low end], it would probably be a higher cost solution."

From the Novell side, analysts said that, as less emphasis is being put on NOSes and more on interoperability and internetworking, Novell needs to expand its horizons.

"Novell needs to get away from being a NOS vendor; that's why they're doing all these deals," said Tom Nolle, president of CIMI Corp., a consultancy based in Voorhees, N.J. "Embracing the routing/hub internetworking paradigm is a smart move. This way, Novell's raising the value of its installed base."

**"SynOptics gets a brand name — the company with the lion's share of the [NOS] market, entry into the NetWare community and low-cost work group routing capabilities."**

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## CORRECTION

The Asynchronous Transfer Mode (ATM) switches to be produced by Cell Relay Systems will bear AT&T's Acculink product-line, not the name given in the story "New AT&T unit will lead ATM charge; switches to ship in Q1," (NW, Aug. 9, page 1).

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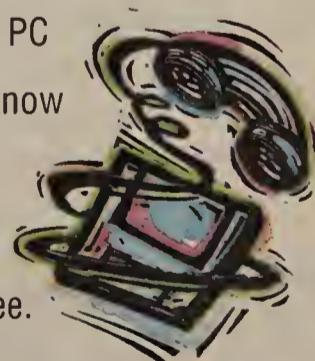


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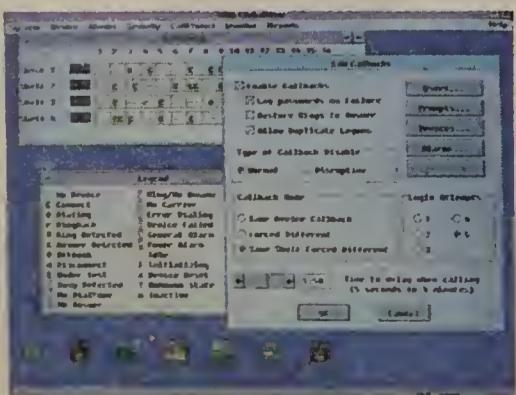
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# ENTERPRISE INTERNETS

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## The module squad

XTree's NetControl management system comprises 3 key modules:

Module	Description	Price	Available
NetControl Console Module	Provides core management services, such as node discovery and configuration control, event logging and trouble ticketing	\$995	November
NetControl Server Module	Monitors CPU utilization, disk and memory capacity, and configuration of LAN servers	\$995	November
NetControl Device Module	Monitors hubs, routers and LAN protocol analyzers distributed throughout an enterprise net	\$495	November

GRAPHIC BY SUSAN J. CHAMPEY

SOURCE: XTREE CO., SAN LUIS OBISPO, CALIF.

## XTree plans to unwrap net mgmt. system

BY JIM DUFFY

San Luis Obispo, Calif.

At INTEROP 93 August this week, XTree Co. will unveil a scalable network management system that allows users to incrementally add more management functionality as their LAN internetworks grow.

Called XTree NetControl, the Simple Network Management Protocol-based system runs on a centralized Windows workstation and collects management information from SNMP agents on local-area network and internetwork systems. It is a modular product with components that provide a core set of management services, as well as device-specific management functions for such things as servers and routers.

With NetControl, users can begin managing their networks with modules for devices currently installed and add modules as new network components come on-line, XTree said.

The modules are the Console Module, Server Modules and Device Modules. The Console Module automatically discovers Transmission Control Protocol/Internet Protocol and Novell, Inc. Internetwork Packet Exchange (IPX) nodes and represents them graphically on a network map. It handles Management Information Base (MIB) compiling and browsing, trap handling, event logging and trouble ticketing.

The Console Module also provides database and report writing services as well as management of networked workstations when those workstations are equipped with third-party SNMP agent software. XTree NetControl supports agent software from FTP Software, Inc., NetManage, Inc., Novell, Standard Microsystems Corp. and Sun Microsystems, Inc.

NetControl will also support the Host MIB specification and Desktop Management Task Force management agents.

The Server Modules govern servers on Banyan Systems, Inc. VINES LANs, Microsoft Corp. LAN Manager and Novell NetWare 2.2 and 3.X. There is a separate Server Module for each type of LAN.

The software monitors CPU performance, memory, disk capacity, usage, logon authorization, software and hardware configurations, as well as file, print, database and communications services. The

See XTree, page 12

## SSA drafts mgmt. plan for distributed net

Staying with centralized manager for LAN internet.

BY MICHAEL COONEY

Baltimore

The Social Security Administration (SSA) is making the move to distributed computing in a big way, but network administrators there are bucking the distributed management trend and banking on a centralized manager of managers to control the agency's growing network.

The agency is planning to install more than 1,500 token-ring local-area networks — supporting tens of thousands of additional personal computers — in the next seven years to bring computing power closer to end users. But it will continue to rely on IBM's

host-based NetView and associated automation products to control the enterprise network from its headquarters here.

Because the SSA has so many applications written to manage its legacy network and systems today — more than 20 million lines of management application code — it would be impossible to shift to a distributed management scheme simply because of the cost of conversion, said Martin Baer, associate commissioner in the SSA's Office of Telecommunications.

"NetView helps us integrate and manage everything in our network and will continue to help us centrally manage our environ-

ment as we move to a LAN-oriented enterprise," Baer said. "We are interested in our employees being the best possible service representatives to U.S. citizens, not computer engineers or network troubleshooters."

Greater reliance on LAN-based computing and effective centralized management are critical for the agency to deal effectively with the big increase in work load, expected with the aging of the baby boom generation.

"As effective as we are today in meeting our work loads — 97% of our users get sub-

See NetView, page 21



BAER

## MULTIPROTOCOL NETWORKING

## IBM improves LAN, applications support

BY MICHAEL COONEY

Raleigh, N.C.

IBM last week announced a variety of products designed to help users manage local-area networks and run existing applications over multiprotocol networks.

The announcements included new versions of IBM's Systems Monitor software, which will help NetView/6000 users manage Hewlett-Packard Co. workstations, and its Host Command facility, which will help users manage Unix-based networks from NetView. IBM also announced frame relay support for its 3172 LAN-to-host gateway and extensions to its AnyNet and TCP/IP for OS/2 programs.

"The overriding strategy with these announcements is to give users the tools to easily build and manage multiprotocol networks," said Sanjiv Ahuja, manager of IBM's AIX network management services.

IBM said its System Monitor/6000 will run on HP 9000 workstations (currently, it runs on IBM AIX platforms distributed throughout a TCP/IP network). It polls devices that are local to it and reports management data back to a central NetView/6000.

"Users can now gather data from HP systems in their networks," Ahuja said. "We also expect that we will have System Monitors for Sun Microsystems, Inc. and NCR Corp. workstations in the near future."

IBM also announced the AIX Host Command and Distribution Facility/6000 application, which links Sys-

tem/390 mainframes with remote AIX workstations. The software enables the host to exchange files with and distribute software to the AIX machines, as well as retrieve configuration data from remote workstations.

The System Monitor for HP systems and the Host Command and Distribution products will be available Aug. 27 for \$750 and \$1,600, respectively.

Ahuja also reiterated that IBM will soon be adding NetView/6000 support for additional third-party databases, including those from Informix Software, Inc., Oracle Corp. and Sybase, Inc. Today, NetView/6000 supports only Ingres databases (NW, May 17, page 1).

"This will give customers a choice of databases on which to store their network management information," Ahuja said.

As expected, IBM added frame relay support to its 3172 Model 3 Interconnect Controller (NW, Aug. 9, page 11). The 3172 is IBM's mainframe channel-attached LAN-to-host gateway, which allows Token Ring, Ethernet and Fiber Distributed Data Interface LANs to connect to a mainframe at high speeds.

With frame relay support, users will be able to tie the 3172 to a frame relay network and, through a single adapter card, run multiple protocols, from Systems Network Architecture to TCP/IP. IBM's frame relay technology supports the Internet Engineering Task Force's Request for Comment 1294, which defines how multiple protocols flow

## BRIEFS

**Ancor Communications, Inc.** last week said it will add Asynchronous Transfer Mode (ATM) segmentation and reassembly capabilities to its Fibre Channel local-area network switches.

Fibre Channel is an ANSI standard for high-speed interconnection of workstations, hubs, switches and other networking gear. ATM segmentation and reassembly will allow the Ancor switches to package LAN traffic into 53-byte ATM cells for transmission over an ATM network and then reassemble those cells back into LAN packets at the destination node.

ATM firmware will be available for Ancor's Fibre Channel interface cards in the first half of next year. Ancor will initially support ATM switching at up to 266M bit/sec. The ATM upgrade for Ancor's Fibre Channel cards will cost \$350.

Ancor: (612) 932-4000.

**Firesign Computer Co.** will announce software that enables users to log on to a remote Unix system over an SNA network. Rlog6.2 is an IBM LU 6.2 transaction program that lets users transfer files between IBM hosts and distributed Unix processors using an existing Systems Network Architecture net. It does not require an additional modem or dial-up line, nor does it require Transmission Control Protocol/Internet Protocol on the host processor.

Rlog6.2 is available now for \$695 to \$2,995. Firesign: (415) 398-7228.

**Cisco Systems, Inc.** last week announced an agreement with Novell, Inc. to support Novell's NetWare Link Services Protocol (NLSP), the next-generation of Novell's Internetwork Packet Exchange (IPX) protocol that promises to vastly improve the scalability and performance of IPX-based internets. The vendor also said it will implement Novell's IPXWAN specification, which defines how various protocols should interoperate with IPX over wide-area links, ensuring interoperability between Cisco and Novell routers.

See IBM, page 16

# Magnalink offers new data compression tool

BY MAUREEN MOLLOY

Norwood, Mass.

Telco Systems, Inc.'s Magnalink Communications division last week announced a data compression device that comes with a built-in data service unit/channel service unit (DSU/CSU) for direct connection to T-1 and fractional T-1 links.

The Series 5000 Access Optimizer is similar to Magnalink's existing LAN/WAN Optimizer, a data compression device for internetwork gear that lowers bandwidth consumption and can reduce wide-area network costs. But the new device is equipped with the features of a DSU/CSU and can be deployed like any other T-1 access device. By integrating the compres-

sion and DSU/CSU capabilities into a single box, users can trim the number of net devices that need to be monitored and managed.

The Access Optimizer compresses Synchronous Data Link Control data and is compatible with bridges, routers, gateways, channel extenders and Systems Network Architecture communications controllers from virtually any vendor, the company said.

By compressing data, the devices can boost the throughput of a bridge, router or gateway from two to four times, depending on the type of information being transmitted. For WAN rates between 4.8K and 128K bit/sec, the

device provides 4-to-1 data compression so a 64K bit/sec line, for instance, will accommodate about 256Kbit/sec maximum throughput. It can also pump between 3M and 6M bit/sec of data across a T-1 link.

The Access Optimizer can ease network congestion and provides users with better response times when accessing remote applications. Without data compression, users with overtaxed wide-area links had to either purchase additional bandwidth or redesign the network, which can be disruptive.

Like the existing LAN/WAN Optimizer, the Access Optimizer includes an automatic error correction capability that eliminates protocol time-outs and the need to retransmit messages due to line errors. It also features automatic dial backup support and uses the same compression technology originally developed for Magnalink's line of compression bridges.

To ensure the privacy and integrity of data transmitted across wide-area lines, the Access Optimizer supports an optional Data Encryption Standard feature that encrypts packets so only authorized recipients can read them.

Pricing for the Access Optimizer starts at \$5,900 and is available now. Existing LAN/WAN Optimizers can be upgraded to an Access Optimizer via plug-in hardware modules and downloadable software.

The product will be demonstrated at INTEROP 93 this week.

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NetControl can also process SNMP traps from other hubs, XTree said.

NetControl's router module supports private MIBs from Cisco Systems, Inc. and 3Com, enabling the management system to graphically display and monitor routes, traffic and protocols from those devices. It can also collect SNMP traps from other vendors' routers.

The RMON module allows NetControl to collect LAN diagnostic information from Novell's LANtern LAN segment monitor. NetControl can graphically depict LANtern-managed segments and monitor traffic, protocols and sessions on those LANs.

NetControl can also process SNMP traps from other vendors' segment monitors.

The Console Module costs \$995 per station, while the Server Modules cost \$995 per server and the Device Modules cost \$495 per managed device. All products will ship in November.

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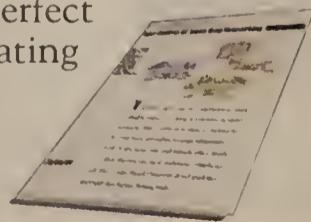
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We're proud to announce the spanking new 68360 QUICC™ multiprotocol communications controller. It's the world's first full 32-bit communications engine, as well as the first controller ever to combine a CPU with WAN, Ethernet LAN and system integration features on a single chip. It's also the most highly integrated design of its kind. And it's bundled with all the performance you need to shake up any communications product.

The product of superior genetics.

The CPU32+ at the heart of the QUICC controller is based on Motorola's 68020 microprocessor, and features a 16- or 32-bit data bus. It's matched with a RISC-based dedicated communications processor that controls four Serial Communication Channels (SCCs), each supporting eight popular protocols. The QUICC controller features a System Integration Module, which incorporates an entire board's worth of functions. And the 68040 Companion Mode lets you disable the CPU32+ to make the QUICC controller a high-performance communications peripheral to a 68040 microprocessor without glue logic.



# er is shaking up the world ons controllers.

It'll make your LANs scream.

The 68360 is also the first controller to integrate Ethernet. In addition to the other eight protocols, the special 68EN360 implements the 10 Mbps Ethernet standard on its first SCC. Its companion chip, the 68160 Enhanced Ethernet Serial Transceiver (EEST™), combines a serial interface adapter with an Ethernet transceiver. Together, the QUICC controller and EEST transceiver combination offers the perfect internetworking solution for Ethernet bridges and routers, along with all the other QUICC applications such as T1 line card controllers, cellular base stations and industrial control networking.

And it's supported by our extended family.

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**MOTOROLA**

# Channel extender firm widens LAN-to-host options

CNT software emulates IBM 3172 gateway.

BY MICHAEL COONEY

Maple Grove, Minn.

Computer Network Technology Corp. (CNT) next week will unwrap enhancements to its channel extension technology that support improved LAN-to-mainframe connec-

tivity.

CNT will announce the 3172 Channel Gateway, which is software for its high-speed ChanneLink mainframe channel extender that enables users to link token-ring, Ethernet and Fiber Distributed Data Interface local-area

networks running the Transmission Control Protocol/Internet Protocol directly to mainframe channels.

The software emulates the 3172 Interconnect Controller, IBM's mainframe channel-attached LAN gateway.

ChanneLink comes in three models capable of supporting 20, 11 or 10 interface slots.

The slots can be configured to support a wide array of wide-area network and LAN interfaces from 52M bit/sec High Speed Serial Interfaces to 100M bit/sec FDDI, as well as standard 4.5M byte/sec mainframe channels.

ChanneLinks can be daisy-chained to sup-

port additional capacity.

The new 3172 Channel Gateway software can be added to existing ChanneLink boxes and will let users bring TCP/IP traffic directly to the IBM mainframe, which will support applications such as high-speed backup of LAN files and disaster recovery.

The ChanneLink supports alternate routing capabilities that enable it to send traffic over a backup link if the primary host connection is down.

"As users move client/server applications out on the LAN, the 3172 Channel Gateway will let them retain high-speed, high-band-

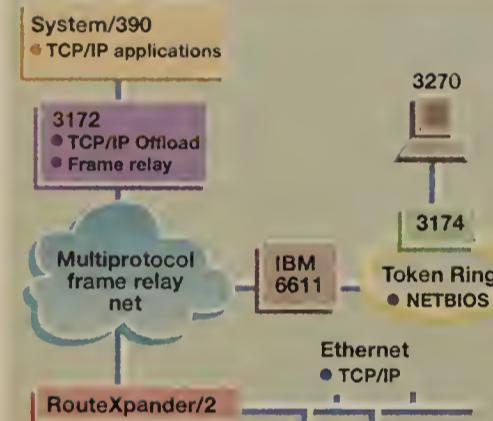
## IBM

Continued from page 11

over frame relay nets.

The frame relay support comes in a software package that users can add to the existing Model 3 operating system. The package includes IBM's TCP/IP Offload feature, which removes TCP/IP processing from the mainframe, and support for NetView Distribution Manager (NVDIM), which enables the host-based NVDIM to automatically distribute software upgrades to the 3172.

### IBM's frame relay support



IBM's announcement last week included frame relay support for the 3172 controller, letting it send multiprotocol traffic to the mainframe through a single interface.

GRAPHIC BY SUSAN J. CHAMPEY SOURCE: IBM, RALEIGH, N.C.

The 3172 joins IBM's 3745 front-end processor, 6611 router, OS/2-based RouteXpander/2 and its 973X Integrated Digital Network Exchange multiplexer, which IBM resells from Network Equipment Technologies, Inc. as Big Blue equipment supporting frame relay. The Model 3 with enhancements will be available Sept. 24 for between \$25,435 and \$48,560, depending on configuration.

In the application department, IBM announced a stand-alone version of its AnyNet/2 for OS/2 product, which is the OS/2 implementation of IBM's Multiprotocol Transport Networking products. MPTN enables applications to communicate over any underlying network protocol. Until now, AnyNet/2 required that AnyNet/MVS run on the mainframe, but now, users can set up AnyNet-based work groups without a mainframe link.

IBM also announced that its TCP/IP Version 2 for OS/2 can be used with AnyNet/2, letting users run existing TCP/IP traffic over an SNA net without an SNA stack on the OS/2 platform, which is necessary today.

AnyNet/2 will be available Sept. 15 for \$175.

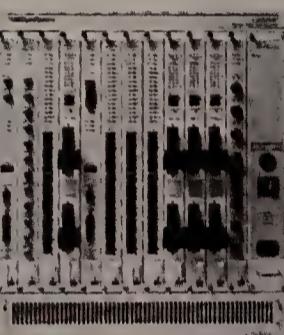
©IBM: (919) 254-4027 (for AnyNet), (919) 301-5928 (for the network management products).

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Consider the valuable information pulsing through your network. Now consider this: How reliable is the hub at the heart of it all?

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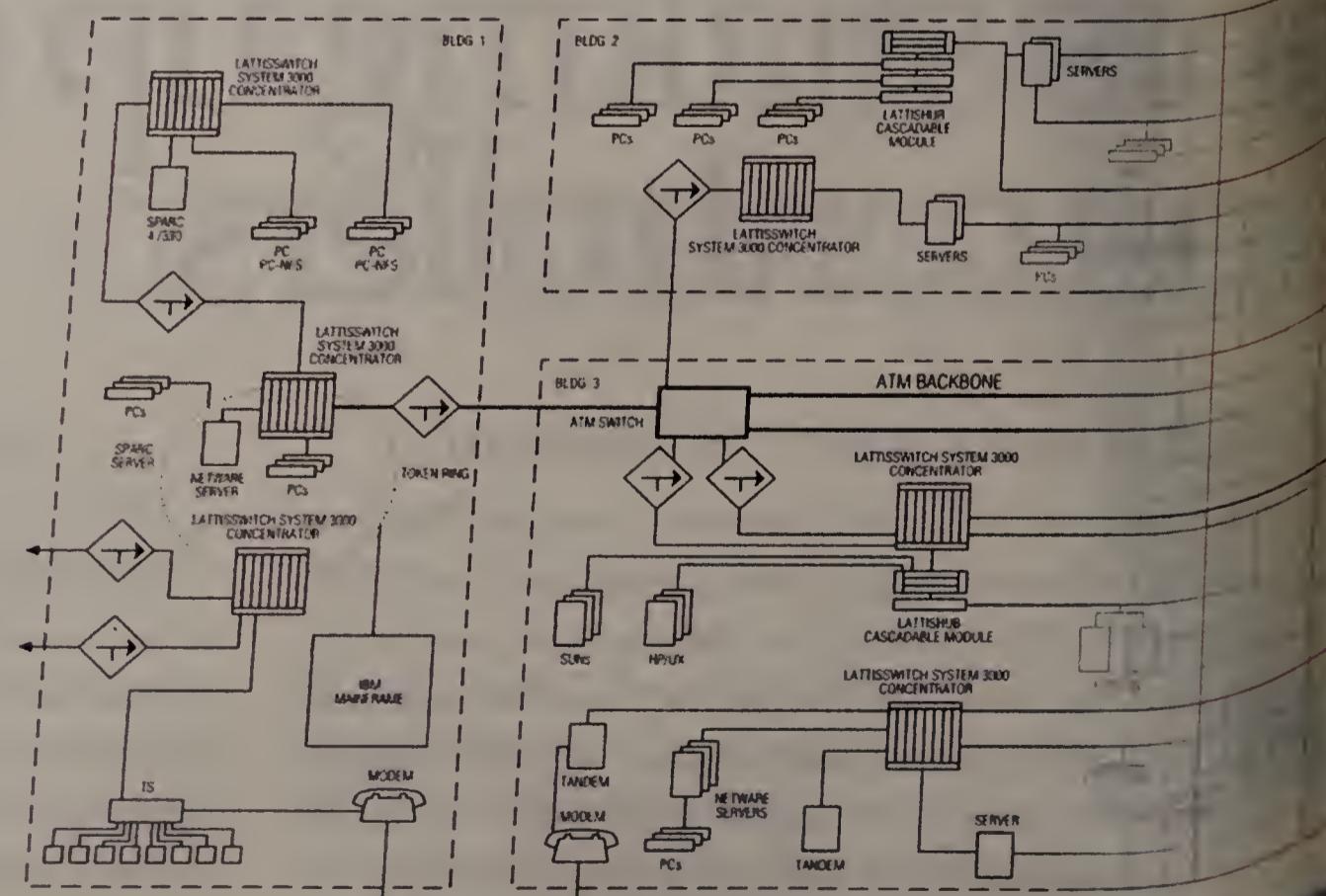
For example, we recently introduced the Model 3800 Cisco-compatible router with an FDDI



Over 3.5 million nodes rely on LattisSwitch™ System 3000 concentrators to never skip a beat.

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## **Put the System 3000 at the heart of your network.**

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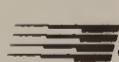


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width access to legacy systems on the mainframe," said Doug Anderson, CNT's communications manager.

"It also lets the LANs share the same channel extension links that are used by other enterprise peripheral equipment, such as storage and communications devices," Anderson added.

The new gateway software gives users 3172 LAN-attachment capabilities without having to invest in and configure a 3172, Anderson said.

He added that the combination of the new software and the existing ChanneLink device

gives users a more powerful option than the 3172.

For example, the largest ChanneLink box can support 10 LAN connections with six to eight IBM hosts.

The largest 3172 can support a maximum of two host connections and four LAN links.

Also, like IBM's 3172 TCP/IP Offload feature, the ChanneLink's 3172 software off-loads TCP/IP processing from the mainframe, saving expensive mainframe cycles.

CNT's 3172 Channel Gateway software is available starting at \$38,000.

©CNT: (612) 550-8000.

## ProTools expands network management platform support

Will also port net analysis tools to Unix, Windows.

BY JIM DUFFY

Beaverton, Ore.

ProTools, Inc. has announced plans to port its network analysis software to a range of operating systems and integrate it with some of the leading network management platforms.

ProTools' Network Analysis Series soft-

ware currently runs on OS/2 workstations. It monitors and diagnoses faults on Banyan Systems, Inc. VINES and Novell, Inc. NetWare nets, as well as networks supporting Transmission Control Protocol/Internet Protocol, Network Basic I/O System and NETBIOS Extended User Interface protocols. The software supports the Simple Network Management Protocol Remote Monitoring (RMON) Management Information Base.

Network Analysis Series polls devices to search for predefined problems such as duplicate addresses, multiple requests for connection and excessive retransmissions. The software analyzes network events and generates reports of network activity from a database of statistical and historical trend information. The package can recommend remedial action or further analysis for certain types of problems.

With support for new operating systems, such as Windows, Windows NT and Unix, users will be able to monitor and analyze nets from the workstation platform of their choice. Integration with management systems, such as Hewlett-Packard Co.'s OpenView and IBM's NetView/6000, will allow users to monitor and collect information on ProTools-managed networks from a centralized SNMP console.

The company this week will demonstrate its progress toward portability at the INTEROP show in San Francisco, where it will display the Windows, Windows NT and Unix versions of Network Analysis Series.

Analysts believe that ProTools' strategy may benefit vendors of management platforms as well as ProTools. "They're filling out a lot of what the platform people need for their products to be really valuable," said Doug Gold, research analyst at International Data Corp. in Framingham, Mass. By adding features such as Network Analysis Series, platform vendors could make them more appealing to application developers, which, in turn, could make those systems more attractive to buyers, he added.

To support multiple operating systems, ProTools is developing portable versions of the product's components, which include Foundation Manager and Cornerstone Agent. Foundation Manager is an RMON-based OS/2 application that allows users to analyze as many as 256 remote local-area networks. Cornerstone Agent is an OS/2-based RMON agent that sends management information to the Foundation Manager and can also serve as a real-time stand-alone analyzer.

Unix versions of these products will initially run on Sun Microsystems, Inc.'s SunOS and IBM's AIX. They will be integrated first with Ungermann-Bass, Inc.'s NetDirector platform and IBM's NetView/6000, and then ported to HP's OpenView and NCR Corp.'s StarSentry management platforms.

Windows versions of Foundation Manager and Cornerstone Agent will be available in the fourth quarter. Windows NT versions will ship in the first quarter of 1994. Both versions will cost \$10,795 for the Foundation Manager and \$1,550 for the Cornerstone Agent.

Unix releases will also ship in the first quarter of 1994. Pricing for those versions has not been set yet.

©ProTools: (800) 743-4335.

## the healthiest networks.

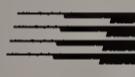
over IP or IPX. All at a new lower price.

The System 3000 is flexible, too. It's expandable up to 264 ports and able to support complex internetworks covering large geographical areas. Presbyterian Healthcare System (PHS) of north Texas, for example, uses our hubs in a network that links four company locations, a dozen clinics and 5,000 employees.

Mel Lively, network manager for PHS, claims SynOptics helped him achieve almost 100% uptime. "I don't know anyone else who can match that record," declared Lively. "And that kind of reliability ends up saving significant time and money in the long run."

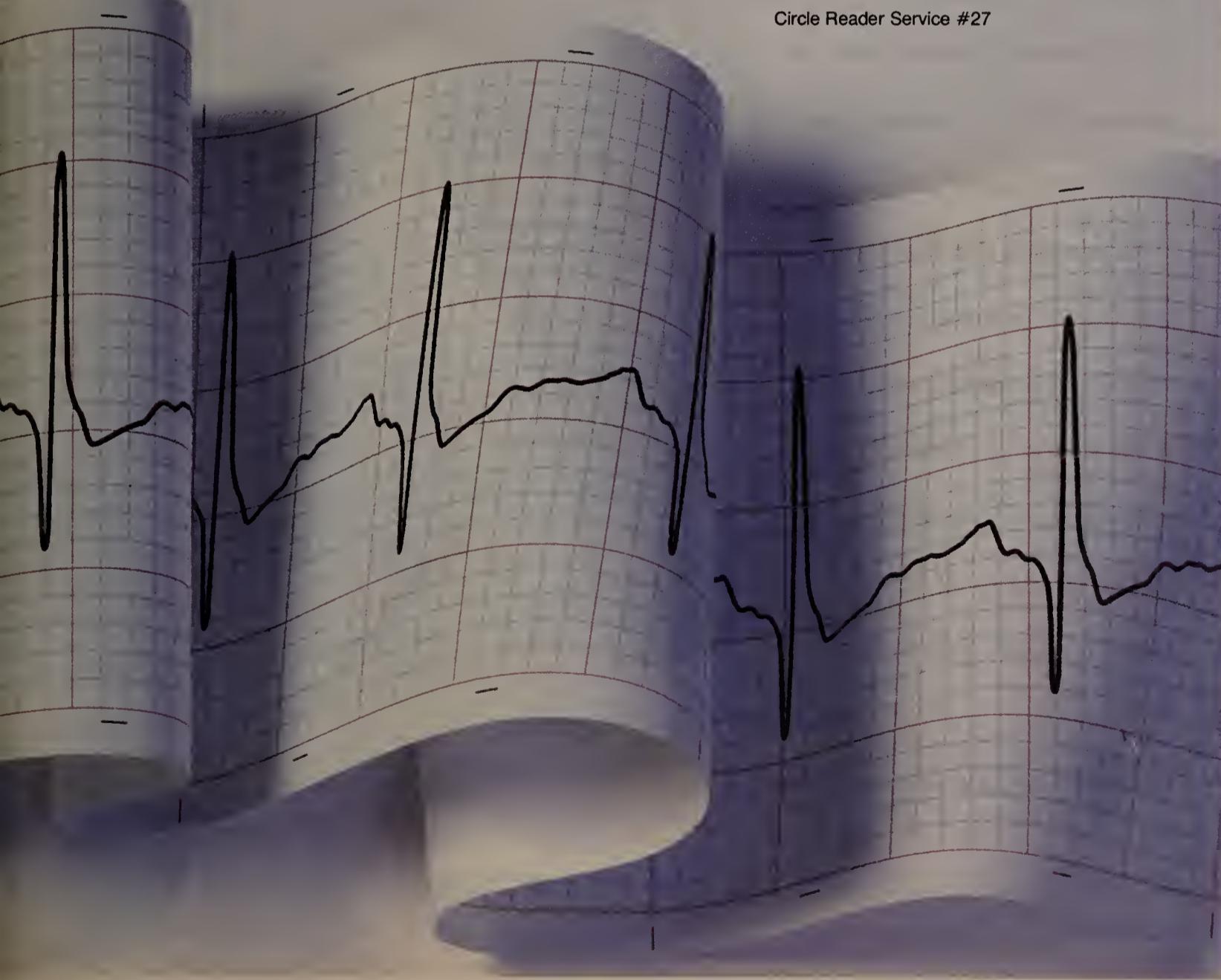
The System 3000 is a key building block of the network fabric—a managed, high-speed communications system that supports new classes of enterprise and multi-enterprise applications. As your business grows, the network fabric will expand and evolve with it.

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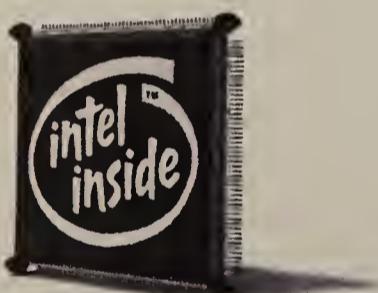
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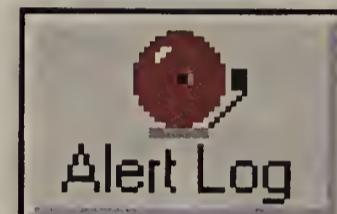
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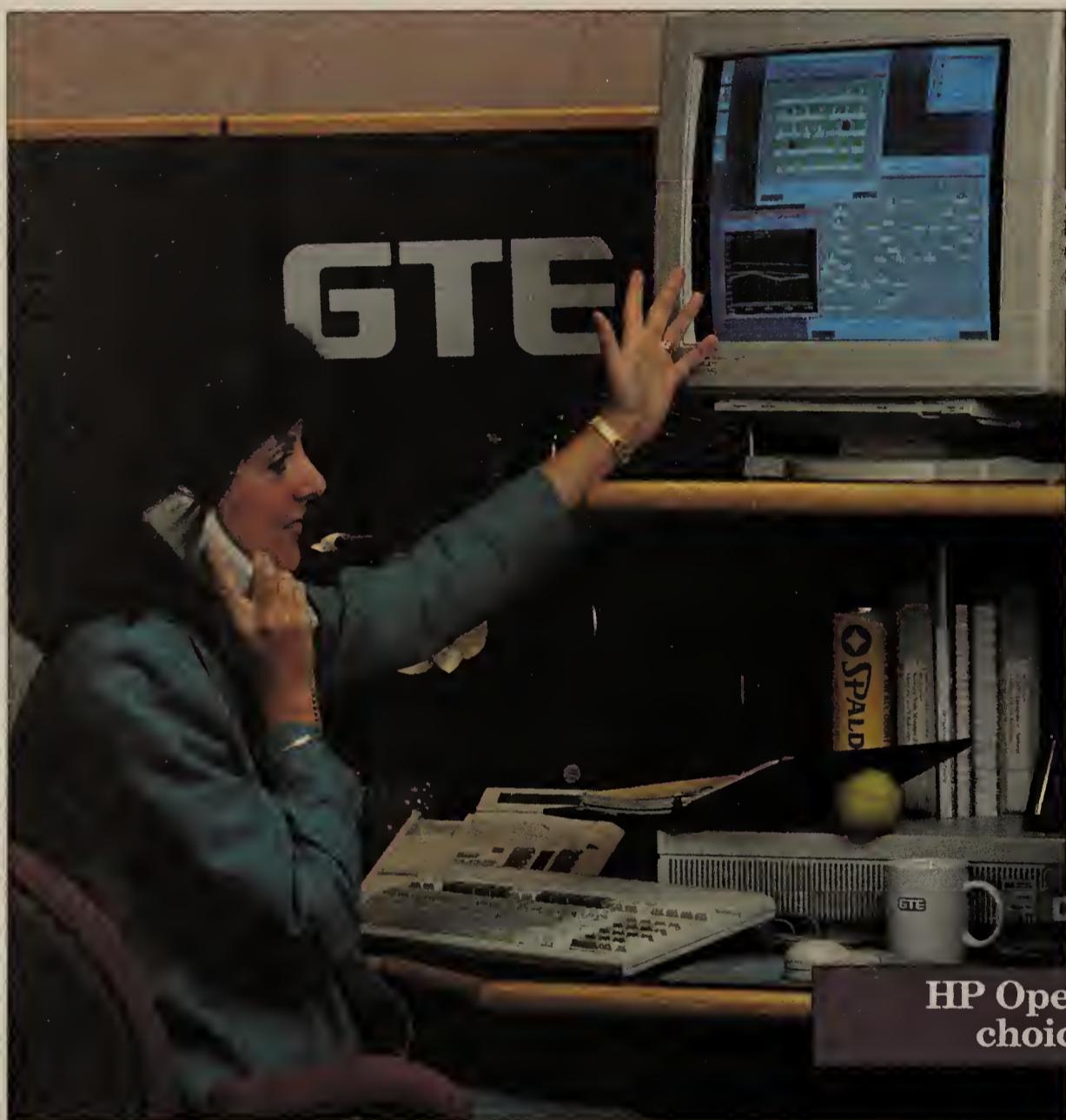


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**Cathy Lytle,  
Systems Engineer,  
Federal Systems Division  
for GTE Government  
Systems**



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**Please Answer ALL Questions, Sign and Date the Form.**

### 1 Industry: (check one only)

- 01. Manufacturers (other than Computer/Communications)
- 02. Finance/Banking
- 03. Insurance
- 04. Real Estate
- 05. Healthcare Services
- 06. Legal
- 07. Hospitality
- 08. Retail/Wholesale Trade/Business Services
- 09. Transportation
- 10. Utilities
- 11. Education
- 12. Process Industries (Mining/Construction/ Petroleum Refining/Agriculture/Forestry)
- 13. Government, State/Local
- 14. Government, Federal
- 15. Military
- 16. Aerospace
- 17. Consultants (Independent)
- 18. Carriers
- 19. Interconnects
- 20. Manufacturers (Computer/Communications)
- 21. VAR/VAD/VAN/ Systems Houses
- 22. Distributors, Computer Related
- 23. Distributors, Communications Related
- 24. Other

### 2 What is your job function? (check one only)

#### NETWORKING MANAGEMENT

- 1. Networking Mgmt. 3. Datacom/Telecom Mgmt.
- 2. LAN Mgmt. 4. Engineering Mgmt.

#### MIS MANAGEMENT

- 5. MIS, IS, IT Mgmt. 6. Engineering Mgmt.

#### CORPORATE MANAGEMENT

- 7. Corporate Mgmt. (CIO, CEO, Pres., VP, Dir., Mgr., Financial Mgmt.)

- 8. Consultant (Independent)

- 9. Other

### 3 My responsibilities include: (check one only)

- 1. LANs/ Internetworking/ WANs 3. LANs 5. None
- 2. LANs/ Internetworking 4. WANs

### 4 What is the total number of sites for which you have purchase influence? (check one only)

- 1. 100+ 3. 20 - 49 5. 2 - 9. 7. None
- 2. 50 - 99 4. 10 - 19 6. 1

### 5 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

<b>A. Scope</b>	<b>B. Involvement</b>
(check one only)	(check all that apply)
<input type="checkbox"/> 1. Corporatewide	<input type="checkbox"/> 1. Recommend/Specify
<input type="checkbox"/> 2. Multienterprise (consultants)	<input type="checkbox"/> 2. Approve
<input type="checkbox"/> 3. Departmental	<input type="checkbox"/> 3. Evaluate
<input type="checkbox"/> 4. None (A or B)	

### 6 Check all that apply in Columns A and B:

- A I am involved in the purchase of the following products/services.
- B I plan to purchase the following products/services in the next year.

#### Plan to Purchase

<b>A</b>	<b>B</b>	<b>LOCAL-AREA NETWORKS</b>
<input type="checkbox"/> 01. Local-Area Networks		
<input type="checkbox"/> 02. LAN Servers		
<input type="checkbox"/> 03. LAN Operating Systems Software		
<input type="checkbox"/> 04. Superservers		
<input type="checkbox"/> 05. Data Base Servers (Oracle, Sybase, etc.)		
<input type="checkbox"/> 06. Terminal Servers		
<input type="checkbox"/> 07. LAN Services		
<input type="checkbox"/> 08. LAN Storage Devices (optical, tape, disk, etc., including backup systems)		
<input type="checkbox"/> 09. Network Test Equipment		
<input type="checkbox"/> 10. Hubs		
<input type="checkbox"/> 11. Cables, Connectors, Baluns		
<input type="checkbox"/> 12. UPS		
<input type="checkbox"/> 13. Network Adapter Boards		
<input type="checkbox"/> 14. Peer-to-Peer LANs		
<input type="checkbox"/> 15. Wireless LANs		
<input type="checkbox"/> 16. SNMP Network Management		
<input type="checkbox"/> 17. ATM (Asynchronous Transfer Mode)		

#### INTERNETWORKING

<b>A</b>	<b>B</b>	<b>INTERNETWORKING</b>
<input type="checkbox"/> 18. Bridges		
<input type="checkbox"/> 19. Routers		
<input type="checkbox"/> 20. Gateways		
<input type="checkbox"/> 21. Bridge/Routers		
<input type="checkbox"/> 22. Hubs		
<input type="checkbox"/> 23. Intelligent Hubs		
<input type="checkbox"/> 24. Communications Servers		

#### Involved Purchase

<b>A</b>	<b>B</b>	<b>COMPUTERS/PERIPHERALS</b>
<input type="checkbox"/> 25. Micros/PCs		
<input type="checkbox"/> 26. Minis		
<input type="checkbox"/> 27. Mainframe		
<input type="checkbox"/> 28. Pen-Based		
<input type="checkbox"/> 29. Laptops		
<input type="checkbox"/> 30. Workstations		
<input type="checkbox"/> 31. Image Processing Workstations		
<input type="checkbox"/> 32. Front-End Processors		
<input type="checkbox"/> 33. Terminals		
<input type="checkbox"/> 34. Printers		
<input type="checkbox"/> 35. Cluster Controllers		
<input type="checkbox"/> 36. Fax Machines		
<input type="checkbox"/> 37. X-Terminals		

#### Involved Purchase

<b>A</b>	<b>B</b>	<b>SOFTWARE/APPLICATIONS</b>
<input type="checkbox"/> 38. Network Management		
<input type="checkbox"/> 39. Micro to Mainframe		
<input type="checkbox"/> 40. Security		
<input type="checkbox"/> 41. Communication/Terminal Emulation		
<input type="checkbox"/> 42. Word Processing		
<input type="checkbox"/> 43. Operating Systems		
<input type="checkbox"/> 44. Business Applications (Finance/Mfg/HR)		
<input type="checkbox"/> 45. Applications Development		
<input type="checkbox"/> 46. Data Base Management		
<input type="checkbox"/> 47. Spreadsheet		
<input type="checkbox"/> 48. Groupware		
<input type="checkbox"/> 49. EDI		
<input type="checkbox"/> 50. E-Mail		
<input type="checkbox"/> 51. Windows/Graphical User Interface		
<input type="checkbox"/> 52. 4GL/Development		
<input type="checkbox"/> 53. Multimedia		
<input type="checkbox"/> 54. Graphics		
<input type="checkbox"/> 55. Utilities		

#### Involved Purchase

<b>A</b>	<b>B</b>	<b>WIDE-AREA NETWORK EQUIPMENT/SERVICES</b>
<input type="checkbox"/> 56. Modems (9.6K bps and over)		
<input type="checkbox"/> 57. Modems (under 9.6 K bps)		
<input type="checkbox"/> 58. T-1		
<input type="checkbox"/> 59. T-3		
<input type="checkbox"/> 60. Fractional T-1		
<input type="checkbox"/> 61. Data Switches		
<input type="checkbox"/> 62. SMDS		
<input type="checkbox"/> 63. ATM (Asynchronous Transfer Mode)		
<input type="checkbox"/> 64. Matrix Switches		
<input type="checkbox"/> 65. Packet Switches		
<input type="checkbox"/> 66. Protocol Converters		
<input type="checkbox"/> 67. Diagnostic/Test Equipment		
<input type="checkbox"/> 68. DSU/CSUS		
<input type="checkbox"/> 69. Microwave		
<input type="checkbox"/> 70. Fax Boards/Modems		
<input type="checkbox"/> 71. VSAT		
<input type="checkbox"/> 72. Fiber Optic		
<input type="checkbox"/> 73. Satellite		
<input type="checkbox"/> 74. ISDN		
<input type="checkbox"/> 75. PBXs (over 1000 lines)		
<input type="checkbox"/> 76. PBXs (under 1000 lines)		
<input type="checkbox"/> 77. Automatic Call Distributors		
<input type="checkbox"/> 78. Voice Messaging Systems		
<input type="checkbox"/> 79. Videoconferencing Systems		
<input type="checkbox"/> 80. Voice Response/Processing		
<input type="checkbox"/> 81. Switched Voice		
<input type="checkbox"/> 82. Dedicated Leased Line		
<input type="checkbox"/> 83. Switched Data		
<input type="checkbox"/> 84. Centrex		
<input type="checkbox"/> 85. E-Mail/On-Line Information		
<input type="checkbox"/> 86. Image Processing		
<input type="checkbox"/> 87. Audio Teleconferencing		
<input type="checkbox"/> 88. Local Services		
<input type="checkbox"/> 89. WATS MTS		
<input type="checkbox"/> 90. International		
<input type="checkbox"/> 91. Virtual Networks		
<input type="checkbox"/> 92. Frame Relay		
<input type="checkbox"/> 93. Value Added Services		
<input type="checkbox"/> 94. None of the above (1-93)		

#### Present Planned

- 07. NOVELL IPX/SPX
- 08. APPC/APPN/LU 6.2
- 09. NETBIOS
- 10. OSI
- 11. APPLETALK
- 12. OTHER

#### LAN OPERATING SYSTEM

- 13. LOCALTALK (APPLETALK)
- 14. BANYAN (VINES)
- 15. DCA (IRMALAN)
- 16. DCA (10-NET)
- 17. IBM (LAN SERVER)
- 18. IBM (PC LAN PROGRAM)
- 19. MICROSOFT (LAN MANAGER)
- 20. UNGERMANN-BASS (NET/1)
- 21. NOVELL (NETWARE, 2.X, 3.X, 4.X)
- 22. PROTEON (PRONET)
- 23. SITKA (TOPS)
- 24. 3COM (3+, 3+OPEN)
- 25. ARTISOFT (LANTASTIC)
- 26. HAYES (LANSTEP)
- 27. DEC (PATHWORKS)
- 28. OTHER

#### LAN ENVIRONMENT

- 29. 4M TOKEN RING
- 30. 16M TOKEN RING
- 31. ARCNET
- 32. ETHERNET
- 33. STARLAN
- 34. FDDI
- 35. LOCALTALK
- 36. 10BASE-T
- 37. OTHER

#### OPERATING SYSTEM

- 38. DOS
- 39. UNIX/XENIX/AIX
- 40. OS/2
- 41. OS/2 2.X
- 42. MVS
- 43. VM
- 44. VMS
- 45. MACINTOSH
- 46. WINDOWS
- 47. WINDOWS NT
- 48. X WINDOWS
- 49. OTHER

### 9 For which areas outside of the U.S. do you have purchase influence? (check all that apply)

- 1. Europe
- 2. Asia
- 3. South America
- 4. Australia
- 5. Middle East
- 6. None

### 10 Which of the following hardware platforms is installed/planned in your company? (check all that apply)

	Mainframes	Planned	Minis	Planned
	Currently Installed	Next Year	Currently Installed	Next Year
01. DEC				
02. IBM				
03. AMDAHL				
04. AT&T				
05. BULL HINNS				

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# NetView

Continued from page 11

second response times — we know the baby-boomer generation, as it moves toward retirement age, will place unprecedented work loads on our enterprise," Baer said. "For example, we know that without increased automation, we would need an additional 20,000 employees by the year 2005 to do the job we are doing today."

## LOOKING AHEAD

The SSA's current network supports communications with 18 mainframes using about 50 37X5 front-end processors and more than 40,000 3270 terminals.

All the Systems Network Architecture equipment will be incorporated into the SSA's distributed computing environment via token-ring technology. In fact, the agency said it will likely need 20 additional 3745s with token-ring interfaces to support

Synchronous Data Link Control devices not currently linked to one of its six regional data center LANs.

The data centers are linked to headquarters over a backbone of private lines ranging in speed from 56K bit/sec to T-1. Regional data centers have 16M bit/sec token-ring LANs bridged over the backbone via IBM's Bridge Program.

Each token ring supports a Novell, Inc. NetWare server, which controls access to the backbone. Local SDLC traffic is brought onto the ring via 3745s with token-ring interfaces. Redundant bridges, rings and lines back up the entire configuration.

Currently, there are fewer than 200 token-ring LANs installed throughout the SSA, but the agency plans to add upward of 1,500 token-ring LANs supporting about 80,000 new PCs in remote offices by the year 2000. The LANs will support a variety of local applications, from survivor benefits to food-stamp programs, while the PCs will also have 3270-emulation capabilities to access applications on the mainframes.

Playing a key role in managing the SSA's new network will be four existing and planned IBM net management products — LAN Management Utilities (LMU)/2, LAN Network Manager, NetView's Resource Object Data Manager (RODM) and Graphics Monitor Facility (GMF).

The tools will enable the agency to pull management data from the distributed LANs and pass it on to NetView, from which administrators will monitor and control the enterprise network.

LMU/2 runs on an OS/2 machine and can feed LAN performance and systems management data to LAN Network Manager and NetView.

RODM is IBM's object-oriented database for storing multivendor network management information. The GMF represents the data stored in RODM on a color graphics monitor.

The SSA will also use IBM's Network Configuration Application software to define objects, such as the LANs and network

devices, used in RODM. The agency now uses LMU/2 and expects to have GMF and RODM in production by the end of the year.

The SSA also plans to automate a growing number of management functions in the future. For example, the agency currently uses IBM's LAN Automation Option (LANAO), which lets NetView automatically respond to alerts from token-ring LANs. If a device on the ring should fail, NetView using LANAO could automatically issue a command to restart the device without operator intervention.

"We will be on the bleeding edge using RODM, LMU and GMF," said James Harring-

ton, director of wide-area network engineering for the SSA. "But we have to be able to manage everything from a central location, and there is really nothing else on the market that will let us do that as effectively as NetView."

The combination of IBM tools will give agency administrators a single, integrated view of the entire network. The SSA currently utilizes IBM's NetCenter graphical monitor, which lets the agency watch SNA and non-SNA devices from a graphical workstation, but the results have not been good.

"We were very disappointed in the presentation capabilities of NetCenter, and we are

hoping that GMF is a major step up in presentation services," Baer said. The SSA is in the process of testing GMF but has not deployed it in production yet. Should GMF not live up to the agency's expectations, Baer said the SSA will consider using IBM's NetView/6000 and SNA/6000 as a graphics front end for NetView.

The agency is also exploring other networking improvements such as frame relay, Asynchronous Transfer Mode and multimedia applications. "We are always looking for better ways to serve the public and get as much information to our service representatives as possible," Baer said. □



ROBERT BURKE

HARRINGTON

## The MuscleModem For LANs

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Data-Link Interface) driver and you can remotely access a wide variety of non-IPX resources attached to your Novell network. Throw in its own data and fax software (MultiExpress for DOS data and MultiExpressFAX Server) and you've got a complete data/fax communications server with the sheer brute strength to handle virtually every data or fax communications application on the LAN.

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standards for fax modems. Use the built-in 9-pin serial port to add a second modem with data and fax capabilities. Modem sharing options include dial-in/dial-out to or from any LAN PC on the network, including the one that's inside the MultiModemLAN.

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We're talking hot technology here. Very hot. In fact, the IBM hubs offer so many striking features and attractive benefits, they're practically irresistible. Take the 8250 Multiprotocol Intelligent Hubs, for example. For any company trying to integrate a complex combination of local or remote Token-Ring, Ethernet or FDDI LANs, it's sure to be love at first sight.

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## *Strategic Hub Solutions from IBM*

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*IBM 8230 Controlled Access Unit (connects up to 80 Token-Ring devices at 16Mbps or 4Mbps, flexible lobe attachment modules, automatic recovery)*

*IBM 8250 Multiprotocol Intelligent Hubs (6-slot/17-slot models, connect a combination of multiple Token-Ring, Ethernet and FDDI networks, slot independence, hot pluggability, port switching, fault tolerance, redundancy and comprehensive management)*



*IBM 8228 Token-Ring Multistation Access Unit (cost-effective, 8 ports, cascading)*



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# LOCAL NETWORKS

Operating Systems, Management, Hubs, Adapters and Other Equipment

## Sniffer analysis ware ported to notebook

BY SKIP MACASKILL

Menlo Park, Calif.

Network General Corp. last week announced that it will begin offering its Expert Sniffer network analysis software on a variety of notebook computer platforms next month.

The company's new Notebook Sniffer Analyzer consists of the Sniffer software and Personal Computer Memory Card International Association (PCMCIA)-based adapter card for either token-ring or Ethernet local-area networks.

"Because budgets and net management staffs are still shrinking while demand for net services is ever

increasing, users are looking for lower priced and more portable Sniffer products," said Sue Carasco, product manager at Network General. "Porting the Sniffer onto a notebook platform was an answer to that."

The Sniffer offers real-time identification of most common network

See Sniffer, page 28

### Take note

IBM Think Pad 720 and 720C  
AST Research, Inc. Computer PowerExec 4/25SL  
Toshiba Corp. T4600  
NEC Corp. UltraLite Versa  
NCR Corp. 3180  
Digital Equipment Corp. PC 425SL and 425LC

SOURCE: NETWORK WORLD

## LANNET targets platforms for net mgmt. pack

BY SKIP MACASKILL

Huntington Beach, Calif.

Embracing an open systems approach, LANNET Data Communications, Inc. last week announced plans to migrate its net management package to the leading enterprise management platforms.

The company will develop a series of object-oriented versions of its MultiMan net management application for use with Hewlett-Packard Co.'s OpenView, SunConnect's SunNet Manager and IBM's NetView/6000.

In addition, LANNET will provide versions for systems based on Windows environments, such as HP's OpenView for Windows and Castle Rock Computing, Inc.'s SNMPC.

These new Simple Network Management Protocol-based applications will enable net managers to monitor and control LANNET's MultiNet and LAN-switch hubs, and perform a variety of functions including port and segment configuration switching, threshold setting, alarm logging and port intrusion control.

The MultiMan applications will support a new Hub Zoom feature that will give managers a real-time representation of the hub's front panel, detailing information such as the modules in place and the cor-

See LANNET, page 26

## Test of NetWare over FDDI finds bridging trouble

BY CARYN GILLOOLY

Sea Girt, N.J.

Customers looking to implement Fiber Distributed Data Interface nets in a Novell, Inc. NetWare environment may run into a small glitch. Bridging traffic from a NetWare client on a token-ring net to a NetWare server on an FDDI net is impossible.

This problem was uncovered during recent testing at InterLAB, an independent network testing and consulting firm based here. InterLAB tested how easily NetWare traffic could be bridged or routed across an FDDI backbone.

The company also tested how beneficial it would be for users to change out their NetWare-based Ethernet or token-ring local-area networks for an FDDI-based NetWare LAN.

In general, the conclusions were favorable with one exception: bridging token ring to FDDI. InterLAB found that translation of NetWare frames to FDDI frames caused addressing conflicts that prevented a NetWare client on a token-ring LAN from reaching

ing a NetWare server on an FDDI LAN.

"The only real 'gotcha' we found in the study was that it's not possible to bridge [NetWare] between a client on a token-ring net and a server on an FDDI net because of some things [NetWare's] IPX does with addressing formats," said Kevin Tolly, president of InterLAB. "If you have a NetWare server on a token-ring backbone and want to migrate that backbone to FDDI, you'll have to buy a router."

Tolly added that this is a NetWare-specific problem. During the testing — which also consisted of running other net operating systems over FDDI — InterLAB found bridging traffic from an IBM LAN Server or Microsoft Corp. LAN Manager client on a token ring to a LAN Server or LAN Manager server on an FDDI LAN was not a problem.

### THE TESTING PROCESS

To find out just how NetWare performed

### FDDI: Spanning the Ethernet gap

NetWare 4.0 Ethernet performance over FDDI (throughput in M bit/sec)

Figure 1



SOURCE: INTERLAB, SEA GIRT, N.J.

in diverse FDDI environments, InterLAB conducted tests in three general configurations:

■ **First, an FDDI ring served as a backbone.** Traffic from a NetWare client on one Ethernet or token-ring LAN was bridged or routed across that FDDI backbone to a NetWare server on another Ethernet or token ring.

■ **Next, FDDI served as the target LAN.** Traffic from a NetWare client on an Ethernet or token ring was bridged or routed to a NetWare server on the FDDI ring. This test was conducted to determine the feasibility of relocating a high-volume NetWare server

See Test, page 26

## E-mail encroaches on work flow tools

BY MARK GIBBS

Of all the services that networks support, the one that has arguably made the greatest impact on how people work is electronic mail. E-mail supports everything from simple interpersonal messaging to so-called work flow systems that manage the movement of data for entire organizations.

While at the simplest level E-mail allows users to exchange plain text, business needs

have forced it to support rich, new formats — messages with specific fonts and character attributes, graphics or even animated images.

But E-mail programs are still little more than handlers and presenters of data. They do not actually care about the contents of the messages other than that they are formatted correctly (correct address, correct character set and so on).

and supports the Simple Network Management Protocol.

Available in the fourth quarter, SwitchStak costs between \$3,995 and \$7,995, depending on configuration.

Calios: (805) 520-8800.

The International Computer Facsimile Association (ICFA) said a standard it has developed for routing fax messages to users on a local-area network will be finalized next spring.

The new standard will allow any person on a LAN or facsimile mailbox system to be assigned a "faxmail" address.

The standard will route faxes using a new file called the Sub-address within the existing Group 3 facsimile protocol.

ICFA: (617) 982-9500.

Horizons Technology, Inc. has enhanced its LANexpert family of local-area network management software with LANauditor 3.0, a LAN inventory program upgraded to audit Macintosh, OS/2 and Windows for Workgroups workstations. Available next month, LANauditor starts at \$495 for a 50-workstation license.

Horizons: (619) 277-7100.

### BRIEFS

Neon Software, Inc. this week will introduce Version 3.0 of its NetMinder Ethernet net analysis software for the Macintosh, which includes an artificial intelligence-based component called Packet Inference that explains any unusual condition it detects.

Other new features include bandwidth utilization analysis and decoding for Network File System and remote procedure call packets. Version 3.0 costs \$595 and is available now.

Neon: (510) 283-9771.

Calios, Inc., formerly Raycom Systems, Inc., this week will announce SwitchStak, a line of stackable Ethernet switching hubs. As many as eight eight-port SwitchStaks can be linked to support 64 users.

The hub provides 10M bit/sec on each port and is based on a high-speed Reduced Instruction Set Computing processor that switches traffic at 50,000 packet/sec. SwitchStak also provides virtual networking capabilities

# Moses intros print-sharing product

BY CHRISTINE BURNS

Los Gatos, Calif.

Moses Computers, Inc. has introduced an entry-level peer networking product, MosesSpool, which gives IBM-compatible



BERKO

PC users running DOS or Windows simple print-sharing capabilities.

MosesSpool uses the print-sharing technology currently integrated into the company's full-fledged peer networking systems, ChosenLAN, PromiseLAN and MosesAll. In addition to providing other peer net services, these products let personal computers send documents to shared printers without additional equipment such as a printer-sharing hub.

"People are afraid of the huge headaches of installing full-fledged networks when they just want to share a printer," said Frank Berko, chairman and chief executive officer of Moses. MosesSpool provides simple print-sharing and a migration path to additional networking services, he added.

The MosesSpool starter kit com-

prises print-sharing software and a network interface card that plugs into the PC. Twenty-five feet of standard telephone wire connects two PCs and hooks one directly to the printer via a serial port on the back of that node.

MosesSpool supports transmission speeds of 2M bit/sec and allows up to six printers to be shared by as many as 53 nodes.

When multiple jobs are sent simultaneously to a single printer, the software queues them in the order the requests were received. Performance of the desktop machine directly connected to a printer is not affected by printing tasks, Berko said.

MosesSpool will begin shipping in September. It will cost \$179 for a two-node starter kit. Additional nodes can be purchased for \$99 each.

MosesSpool users can upgrade to one of Moses' complete peer-to-peer net operating systems, which supports application- and file-sharing capabilities, as well as electronic mail services, without buying additional hardware.

ChosenLAN supports a maximum of 53 PCs, while PromiseLAN bundles peer capabilities with several third-party business applications. MosesAll supports up to eight nodes with a data rate of 1.79M bit/sec.

To upgrade software to ChosenLAN, PromiseLAN and MosesAll will cost \$99 per site. ©Moses: (408) 358-1550.

## Comments

If you have a comment on this or any other article, drop us a fax at (508) 820-3467 or call (800) 622-1108, Ext. 487.



costs \$5,995 or comes bundled with OpenView for \$16,995.

In a similar fashion, LANNET became part of IBM's NetView/6000 Association Program when it unveiled the MultiMan/6000 application for NetView/6000. MultiMan/6000, which runs on IBM RISC System/6000 workstations, will be available by year end.

Pricing will be announced at that time.

The applications for SunNet Manager and SNMPc, as well as for MultiMan/SNM and MultiMan/Win, will also be available by year end. Pricing has not been set.

The Ethernet and token-ring Remote Monitoring (RMON) applications and hub probe modules are expected by the first half of 1994, along with the company's protocol analyzer applications.

Pricing on all three products will be announced at that time.

To complement these applications, LANNET is developing a suite of RMON and protocol analysis applications, as well as probe modules for LANNET hubs that will enable HP, IBM and SunConnect managers to collect more detailed network information about token-ring and Ethernet LANs.

©LANNET: (714) 891-5580.

# DigiBoard announces software diagnostic tool for Unix LANs

BY CHRISTINE BURNS

Minneapolis

DigiBoard, a division of Digi International, Inc., has released a software diagnostic tool to monitor the activity of its serial communication products used in Unix-based local-area networks.

The DigiBoard Port Authority (DPA) software sits on each personal computer housing a DigiBoard serial interface and monitors activity, enabling a system manager to gather information about serial port usage from any terminal on the net.

"If you're a manager of a system with 100 serial ports to monitor, DPA will make your life much easier," said Joe Toste, product manager for serial port products at DigiBoard.

The software supports all DigiBoard serial connectivity products, including the DigiChannel PC/Xem family of multichannel communication boards for PCs and the DigiChannel C/X and EPC/x families of PC-based controllers. The Unix systems that support the products include Unix System Laboratories, Inc.'s Unix SVR4, The Santa Cruz Operation, Inc.'s SCO for Unix and IBM's AIX.

DPA keeps track of the original configuration of a board and checks activity to see whether it is transmitting data properly. The contrast of the two conditions allows an administrator to determine if there is a problem.

The software also provides a status report of individual ports on a controller by displaying a simulated concentrator front panel on the terminal used by the system administrator. Each of the eight standard RS-

232 signals supported can be displayed.

In addition to the signals, DPA also monitors and reports port statistics, including status for I/O flow control, host adapter and concentrator connection.

Information about each individual port can be accessed from any terminal on the net. This eliminates the need for a system manager to search for status updates on the concentrator's liquid crystal display, typically stored in a remote closet.

DigiBoard this week will begin shipping DPA with all its serial board device drivers on all of its intelligent serial port boards. DPA loads automatically when the drivers are installed. The cost of the boards ranges from \$299 to \$2,895.

In a separate announcement, DigiBoard released the 8em eight-port modular intelligent serial board for Industry Standard Architecture (ISA), Extended ISA and Micro Channel Architecture-bus computers. This low-end addition to the company's DigiChannel PC/Xem family of serial boards supports eight concurrent users connected to a host personal computer on a Unix Ethernet network. The 8em supports Unix SVR4, SCO for Unix and AIX.

The 8em has a Reduced Instruction Set Computing processor and a data throughput rate of up to 115K bit/sec. The 8em also supports an optional parallel port installed on a PORTS/8emp connector module for increased throughput connections to a printer. The 8em, available in September, is priced at \$1,095, with an additional \$200 charge for the parallel port connection.

©DigiBoard: (612) 943-9020.

# LANNET

Continued from page 25

responding LED status.

Managers will also be able to view and configure virtual local-area networks with the MultiMan applications.

A physical view will depict hubs with virtually networked ports highlighted, while a logical view will offer windows that contain a list of users connected in the virtual LAN.

LANNET's new suite of applications are written in C++ and use object-oriented design and programming techniques to ensure future integration with the Open Software Foundation, Inc.'s Distributed Management Environment. The MultiMan applications include MultiMan/OV, which is for HP's OpenView for Unix platform.

HP named LANNET as an OpenView Premier Partner, whereby LANNET, under terms of the partner program, will resell OpenView for Unix bundled with its MultiMan/OV. The two companies will cooperate in marketing and demonstrating both products.

MultiMan/OV 1.0 will be available in October. The stand-alone product

**Managers will also be able to view and configure virtual LANs with the MultiMan applications.**

## Test

Continued from page 25

onto an FDDI-based net.

■ Finally, FDDI served as the LAN itself. Both a NetWare client and server were connected to the same FDDI ring to determine the feasibility of changing out a single Ethernet or token-ring LAN with a single FDDI LAN.

Novell's Perform3 software was used to measure performance in each configuration. Perform3 is an optimized file-transfer application that runs in the NetWare server and measures throughput of single or multiple NetWare sessions in kilobytes per second.

Each test consisted of continuously transferring a 32K-byte file for two minutes and measuring the throughput. Each test was performed three times. The three test results were then averaged and converted to megabits per second (see graphic, this page).

## THE RESULTS

Bridging was the biggest problem InterLAB encountered. Ethernet-to-FDDI translation bridging is not a problem, as it is specified in the FDDI standards. The problem comes with bridging from token ring to FDDI.

NetWare's Internetwork Packet Exchange (IPX) frames contain a node address within the data field. This node address typically

matches the frame's ultimate destination media access control (MAC) address. In a bridged environment, this means the node address is identical to the destination MAC address of the frame.

However, token ring and FDDI use different MAC address transmission formats. When a bridge carries a frame from token ring to FDDI, the IPX bridge translation mechanism reverses the bit order of the MAC addresses, producing mirror images of the originals. This yields a useless frame in which the destination MAC address no longer matches the node address.

The problem corrects itself when FDDI is used as a backbone between two token rings. This is because the address mirroring effect occurs twice — once as the frame is bridged from token ring to FDDI and again as it's bridged from FDDI back to token ring. The combination of two flips yields a correct MAC header and a valid frame.

However, if the user has implemented a high-end server on an FDDI ring, the mirroring effect occurs only once, the bridge produces an invalid frame, and communication fails.

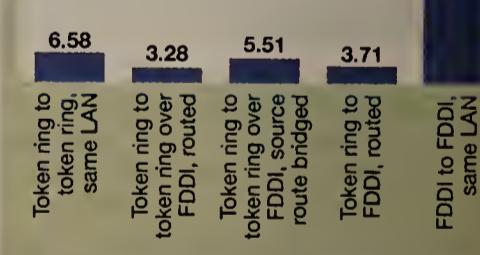
In other results, InterLAB

found that routing was no problem. Routing works equally well when connecting a token ring to a token ring, a token ring to an Ethernet or an Ethernet to an Ethernet across an FDDI backbone. And

## FDDI: Spanning the token-ring gap

NetWare 4.0 token-ring performance over FDDI (throughput in M bit/sec)

Figure 2



GRAPHIC BY TERRI MITCHELL

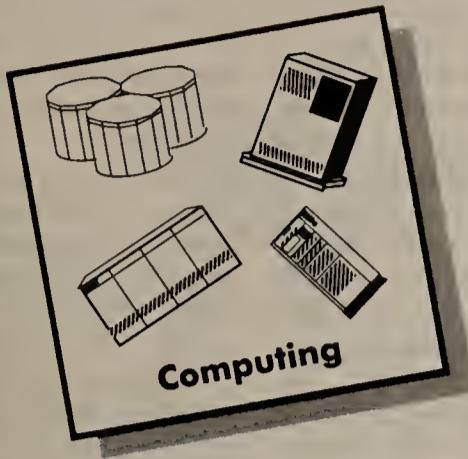
SOURCE: INTERLAB, SEA GIRT, N.J.

Ethernet and token ring perform equally well in all these scenarios.

Routing traffic across FDDI between token-ring and Ethernet end stations was successful in all tests: The router treats FDDI as just another LAN in the internet.

The study also found that moving a net over from Ethernet or token ring to FDDI would yield performance gains. NetWare 3.11 performance on FDDI was six times faster than 16M bit/sec token ring and 12 times faster than Ethernet. NetWare 4.0 performance on FDDI was nine times faster than 16M bit/sec token ring and seven times faster than Ethernet. ■

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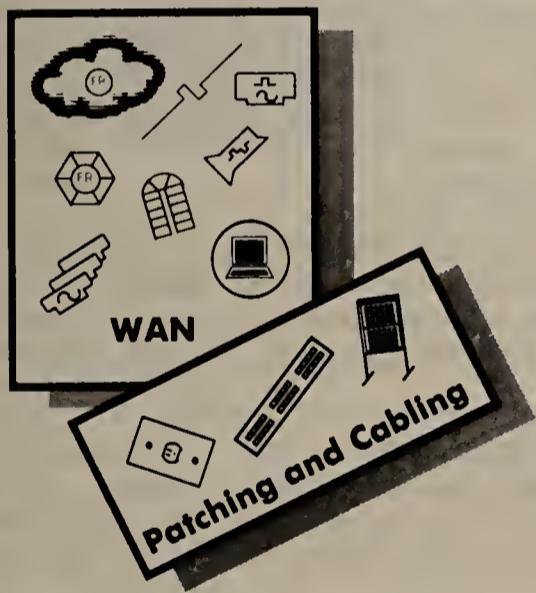


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Continued from page 25

plete, the work flow system forwards it to the users' manager, who OKs it by simply checking a box on the form, then it is routed to the purchasing department. There the form is printed as a purchase order, and an electronic copy is sent to accounts for reference.

Most of the current work flow systems are based on the idea of modeling organizational processes. The problem with the top-end work flow systems is that if the system is to have a real payback, a significant investment of both time and money is required.

The processes to be automated require detailed analysis, coding, testing and so on. The result has been that work flow, as desirable as it may be, has not been for everyone.

If your organization cannot afford a full work flow system, there is a middle ground. Between the extremes of simple E-mail and full-blooded work flow, a new class of electronic messaging systems is emerging — E-mail that can be made smart.

Smart features have been creeping into E-mail systems for some time. One of the earliest products to use intelligence in the handling of messages was The Coordinator from Action Technologies, Inc., a product now owned by Da Vinci Systems Corp. in Raleigh, N.C.

The Coordinator allows users to structure conversations and establish who is to do what tasks and when they will be done. It supports the management of messages by content — what might be called "thematic" E-mail.

The Coordinator is a good product but, for many organizations, fails in one important respect: flexibility. If your organization commits to using The Coordinator, it is buying into a predefined way of structuring how people communicate. The Coordinator is about managing the way people work together, not about handling and routing data sent by E-mail.

Missing from the market are programmable E-mail products that you can use to define what you want to happen when you receive E-mail and how to handle the contents.

The latest and most sophisticated product to offer intelligent, programmable handling of messages and their data is BeyondMail from Beyond, Inc. in Cambridge, Mass.

## GOING BEYOND

BeyondMail appears, at first glance, to be a fairly standard E-mail package. It can currently work with Novell, Inc.'s NetWare Message Handling Service (MHS) (at the SMF-70 level) and Banyan Systems,

Inc.'s VINES Intelligent Messaging and is available under both DOS and Windows.

BeyondMail is a folder-based system with predefined folders for Inbox, Outbox, Drafts, Sent, Tickler and Trash. Users can define whatever folders they need.

It is also forms based, offering a variety of templates for creating messages for specific purposes. The product comes with a variety of predefined forms, such as memos, request forms, customer support requests and phone messages. The forms can include checkboxes and fields that offer multiple choices. It also offers a forms designer so organizations can create their own message templates.

But where BeyondMail is truly different from other products is in offering rules for handling E-mail.

The simplest of these rules are Ticklers. A Tickler is a message that is moved to the Tickler folder and scheduled to be presented again at a specific date and time. Like most of the BeyondMail features, Ticklers can be enhanced to be much smarter by programming.

Ticklers are very useful for deferring mail so you do not forget about it. For example, if you are one of those lucky people who gets 50 or so messages a day, you will probably get some items such as "Could you send me the report you're writing?" or "What's John's opinion?" Since you have the other messages to deal with and the report is not finished or John is out until Friday, using the Tickler to resend the message for delivery at a later time ensures you will not forget it.

The next and slightly more complex set of rules is the Message Clerk group of rules. These define what you want to have done to messages when they arrive.

A Message Clerk rule defines how to handle an incoming message based on what type of message it is (for example, memos and customer support requests, as well as forwarded messages of various kinds), who it is from and key words in the subject line. The Message Clerk handles the message by moving it to a folder and optionally notifying you that it has done so.

A simple use of the Message Clerk would be to delete junk mail. Say that personnel regularly sends out memos on the squash ladder rankings and, not being a squash player, you would rather not see these. Rather than trying to get your name removed from their distribution list, you merely define a Message Clerk rule that says, "If a new message is received from Personnel and the word squash is in the subject line, move it to the trash folder and don't notify me." Problem solved.

You can setup as many different Message Clerk rules as you like and enable or disable the Message Clerk as required. Other uses might be to move customer support requests into your Urgent folder or to move all received delivery notifications to the folder "They Got It."

BeyondMail has two other kinds of simple rules. The "While I'm Out" rules allow you to set up the times when you will be away from your personal computer and how you want the messages handled. Outside of the specified dates and times, the rules will be inactive. This allows you to set up the rules well before an absence and know that they will be automatically disabled when you return.

The "While I'm Out" rules are a bit more complex than the other rule sets. They are a superset of the Message Clerk rules, and you can have messages replied to, forwarded and resent. You can also have BeyondMail check if the message is urgent and whether it was sent directly to you (that is, you were not addressed through a distribution list).

The last of the simple rules, the "AutoForward" rules, are like the "While I'm Out" rules without the date control and reply to sender capability.

For many situations, the simple rules are more than adequate for messaging traffic. When you require complex message handling, BeyondMail lets you define what is to happen through a custom language.

A simple built-in programming interface allows you to define rules using a "When-If-Then" template. The alternative is to write rules using either the built-in text processor or an external one and importing them.

You define a rule by first giving the rule a name and assigning it to a rule set (a group of rules). You can enable and disable rule sets and individual rules as required.

The next step in defining a rule is to set what event will trigger the rule. BeyondMail recognizes 11 different trigger conditions called "When" events. There are two types: message-based and non-message-based.

The When conditions for message-based events include a new message arriving in the Inbox folder, a message being read for the first time, a message (read or unread) being moved or copied from one folder to another and so on.

Non-message-based When events include BeyondMail being exited or started up, a specified period ending, a specified day and time arriving, etc. You then define what conditions have to be met when a When event is triggered. These conditions are the "If" part of the rule. The If conditions include who the message is from, the date sent, whom it was sent to, subject and any

# Sniffer

Continued from page 25

problems — such as slow file transfers, misconfigured routers and broadcast storms — at all seven Open Systems Interconnection layers and offers a list of possible causes for the problems.

The credit card-sized PCMCIA cards slide into the notebook's adapter card slot and offer connection to either token-ring or Ethernet segments.

"The Notebook Sniffer Analyzer has all the same features and functionality — expert analysis, protocol decode and network monitoring — as the existing Expert Sniffer analyzer on a portable platform," Carrasco said.

"The only limitation is that it doesn't support FDDI and internetworking abilities like our higher end models," she added.

The Notebook Sniffer can coexist on the notebook with other DOS- and Windows-based applications and does not require a dedicated platform, meaning a technician only needs to take one device along to a remote site.

"Because they still have access to other applications on the notebook, as well as the Sniffer functionality, they can troubleshoot on-site and do their trip report on the flight back," Carrasco said.

The Notebook Sniffer, which can be used on six 486-based notebook platforms in its initial release (see graphic, page 25), will be available next month in both a token-ring and an Ethernet version.

Each model will sell for \$9,995 and include the PCMCIA card and Expert Sniffer software.

ONetwork General: (415) 473-2000.

ter, and Beyond is pulling out all the stops. Bundled with BeyondMail will be Watermark Viewer, a document image handling and markup system from Watermark Software, Inc. of Burlington, Mass.

The new version also supports serial message routing (the ability to specify a sequence of users who will sequentially handle the message), integration with third party forms, access to databases, support for NetWare Global MHS (through SMF-71 support), integration with NetWare 4.0's NetWare Directory Services and the ability to work with Lotus Notes as an Alternate Mailer as well as being able to access and work with Notes databases.

As if all that were not enough, Beyond has introduced the rules engine of BeyondMail as a module to supply rules-based message handling for Windows and the Macintosh.

The Macintosh version, called MacRules, will allow users to control the PowerTalk client mailbox under Apple's Open Collaboration Environment.

The Windows version, WinRules, works with Microsoft Mail and Microsoft Schedule+ in Windows for Workgroups. Beyond also plans to release Macintosh and Unix versions of the full BeyondMail product.

Although the new version isn't a full work flow solution, it has many of the required components and ties them together with an interface that is easy to use and very flexible. Beyond is setting an astounding standard for the competition to meet.

• Gibbs is a writer and consultant based in Ventura, Calif. He can be contacted at (805) 647-2307, through CompuServe (75600,1002) or on the Internet (mgibbs@rain.org). He is the author of the *The Absolute Beginner's Guide to Networking and Navigating the Internet*.

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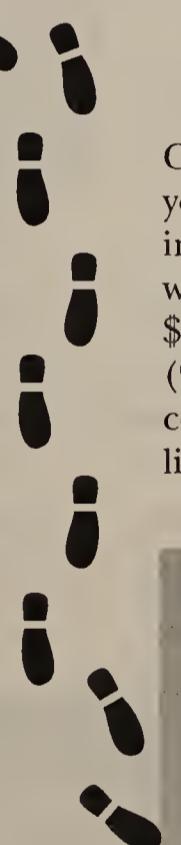
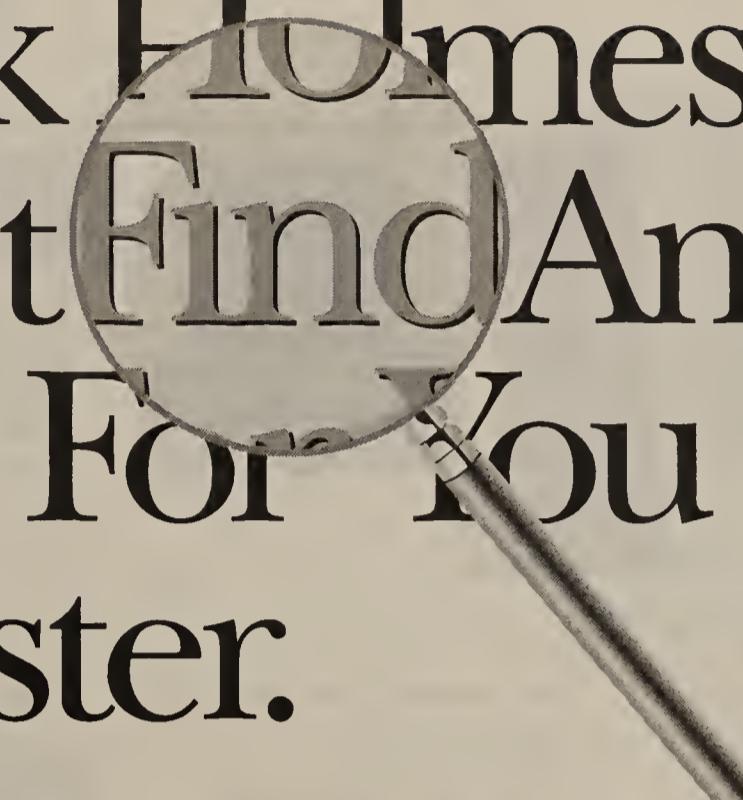


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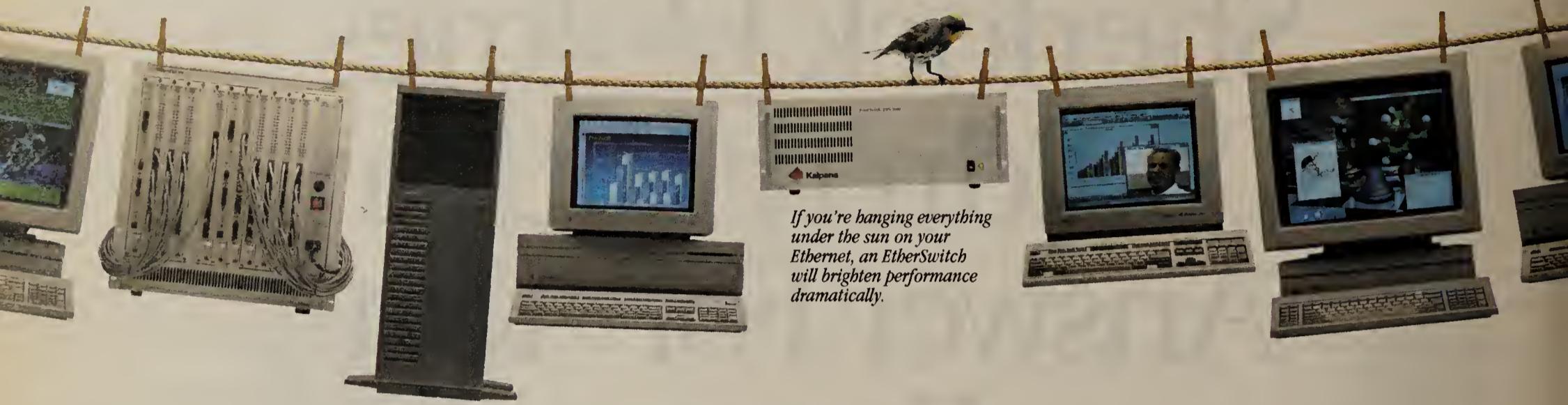
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New, monster applications. Multimedia. High-speed servers. High-volume transfers between floors and buildings. They've got your network backbone sagging, timeouts multiplying, and response times down to a crawl.

## IF THE PROBLEM IS CONGESTION, THE SOLUTION IS BOOSTING THROUGHPUT.



Bridges and routers are designed for protocol isolation, wide area connectivity and connecting dissimilar networks.

Kalpana EtherSwitches are designed to boost local network throughput.

*A few minutes, a few cables, and EtherSwitch gives you instant Ethernet decongestion.*

When you're fighting overloaded local connections, you need to switch.

## ETHERSWITCH® IMMEDIATELY ACCELERATES THROUGHPUT BY AS MUCH AS 600%.

Instead of sending single packets one at a time, the EtherSwitch works like a telephone PBX, sending several packets at once on parallel paths.

Suddenly a 10Mbit/s network becomes effectively a 70 Mbit/s network. Peak loads are eliminated and every user gets all the bandwidth they need. All the time.

Those CAD drawings take seconds. Building-to-building conversations happen instantly. Collisions are drastically reduced.

And you don't have to tear anything apart to do it. You just plug in a Kalpana EtherSwitch. It takes five, maybe ten minutes.

*You don't have to destroy your existing network structure just to get faster response times.*

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Unlike routers, an EtherSwitch is truly a plug-and-play solution.

There's no software to install or maintain. They're protocol independent. And they automatically recognize all the different equipment on your network.

Nothing has to be redesigned, reconfigured, re-routed or re-educated, including your users.

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*Installing and maintaining a router is no small item.*

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## AND YOU GET YOUR MONEY'S WORTH OUT OF THE NETWORK YOU ALREADY HAVE.

Instead of waiting for ATM or starting over with FDDI, EtherSwitch gives you the speed you want now with the network structure you already have in place. For a fraction of the cost. You solve your performance problems and put switching technology in place that has a future with ATM.

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Call Kalpana at **800-488-0775** or 408-749-1600 for a Try'n Buy evaluation unit. Return it within 14 days if you're not completely happy. We'd also be happy to send you a white paper, "How an Ethernet Switch and Multiport Router Compare," or an animated disk that explains Ethernet switching.

So when is a simple switch a smarter choice? Now.



**Kalpana**

*The EtherSwitch Company*

Circle Reader Service #20

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## BRIEFS

Octel Communications Corp. has signed a three-year distribution agreement under which **Southwestern Bell Telecom** will distribute Octel's line of voice processing systems.

Under the arrangement, Southwestern Bell Telecom will market the Octel products to users in Kansas, Oklahoma, Texas, Missouri and Arkansas. The company will also provide installation and service.

**US West, Inc.** has launched a program, called Caller Pays, for cellular customers in Boise, Idaho. Cellular customers have traditionally paid for calls both to and from their phones. However, under the new system, they will pay only for calls they make, while callers to their cellular phones will be alerted that they will pay a toll for the call.

The service is \$2.95 per month for cellular customers, while callers pay 45 cents per minute during peak hours and 30 cents off peak.

Tyson Foods, Inc. has awarded a five-year contract to **Southwestern Bell Telephone Co.** for a high-speed network linking Tyson's Springdale, Ark., headquarters with Southwestern Bell central offices for connection to wide-area networks. The Southwestern Bell installation includes 18 T-1 lines, two T-3 lines and four multiplexers.

**Infonet Services Corp.** has opened an office in Moscow for data, electronic mail and facsimile transmissions. Local sales and support are handled by Infocom, a company jointly owned by Infonet Services, the Russian Institute for Automated Systems, the Moscow Local Telephone Network and a trio of Finnish companies. Until the Moscow facility opened, Moscow businesses had been routing traffic through Infonet Services' Helsinki, Finland, office.

Owens-Corning Fiberglas Corp. selected Brussels, Belgium, as its European telecommunications hub, where carrier **Belgacom** will provide the fiberglass manufacturer with a digital network to 18 European locations, as well as a transatlantic link to company headquarters in Toledo, Ohio.

**AT&T EasyLink Services** has announced a new version of its Macintosh access software: AT&T Mail Access Plus.

In addition to basic access to AT&T EasyLink's messaging services, the new version adds the ability to attach multiple files to a single message, establish an unlimited number of electronic folders to store and organize messages, and offers an improved user interface.

In beta test now, the \$210 software is due to ship in September in the U.S. and within a couple months worldwide.

The company released an updated version of its Windows software earlier this year and is now testing a version geared to work with the RAM Mobile Data, Inc. wireless network and Intel Corp.'s packet radio modem.

AT&T EasyLink: (800) 242-6005.

See Briefs, page 37

## AT&T grabs all of McCaw

*Bold \$12.6 billion deal advances AT&T's grand plan for mobile computing.*

BY ELLEN MESSMER AND BOB WALLACE

Basking Ridge, N.J.

AT&T last week invested \$12.6 billion in its vision of a new communications landscape with the buyout of cellular service giant McCaw Cellular Communications, Inc., a move that ensures AT&T a big role in shaping the future of personal communications services and mobile computing.

Along with AT&T's interests in such companies as EO, Inc., GO Corp. and General Magic, Inc., ownership of McCaw positions AT&T to provide users with everything from hardware and software to a range of new voice and data services so they can support wireless calling and computing. McCaw's cellular services also give AT&T new options for connecting customers directly to its long-distance network.

"The sky's the limit," said Peter Bernstein, senior vice president of Probe Research, Inc., a Morristown, N.J., consultancy. "Almost anything you can think of is ripe for discussion."

### ALL THE WAY

AT&T's purchase of McCaw, the fifth largest merger in U.S. history, is expected to take about 12 months to complete, given regulatory approval (see story, page 114). It will give the long-distance carrier control over cellular operations in 105 major markets nationwide.

AT&T had announced in November plans to buy a 33% stake in McCaw for an estimated \$3.7 billion, an arrangement that was supposed to be finalized a few months ago. But the two companies "came to the



ALLEN

realization that it would be very difficult, if not impossible, to get our visions aligned," said Robert Allen, chairman and chief executive officer of AT&T. "A merger offers the best, quickest way to go after this market."

A McCaw spokesman said the two sides could not agree on which company would hold the cellular licenses or what the long-term direction would be for the services.

"Wireless communications services are absolutely essential to AT&T's network strategy and [are] key to the company's future earnings growth," Allen said.

In the all-stock transaction valued at \$12.6 billion, shares of McCaw's stock will be exchanged for one AT&T share.

McCaw's cellular network, which serves some 20% of the roughly 10 million U.S. cellular users, was pulled together bit by bit through years of investment and has not yet shown a profit. But AT&T said the merger will account for at least 10% of the carrier's annual earnings growth, with the dawn of the personal communicator and the emergence of cellular packet-data services.

"Although voice calls are important, I think the greatest interest will be in services that can support data transmission," said Ira Brodsky, president of Datacomm Research Co., a Wilmette, Ill.-based consultancy that specializes in wireless communications. "AT&T had to make this move in order to address the mobile computing market."

### END-TO-END

The McCaw deal is part of an investment blitz that will give AT&T the ability to deliver end-to-end in the wireless market,

### Profiles of the players

#### AT&T

**Headquarters:** Basking Ridge, N.J.  
**Top official:** Robert Allen, chairman and CEO  
**'92 revenue:** \$64.9 billion  
**'92 profit:** \$3.807 billion  
**Employees:** 316,000  
**Business:** Has stakes in EO, Inc. and GO Corp.; is holding: an investor in General Magic, Inc.; owns NCR Corp. and AT&T Paradyne

#### McCaw Cellular Communications, Inc.

**Headquarters:** Kirkland, Wash.  
**Top official:** Craig McCaw, chairman  
**'92 revenue:** \$1.7 billion  
**'92 profit:** \$285.6 million  
**Employees:** 6,300 (includes subsidiary LIN Broadcasting)  
**Business holdings:** LIN Broadcasting

SOURCE: AT&T, BASKING RIDGE AND MCCAW CELLULAR COMMUNICATIONS, KIRKLAND

from the end user's mobile voice and data equipment to network services. AT&T last month raised its stake from 20% to a controlling interest of 51% in the Palo Alto, Calif.-based EO, maker of the hand-held EO Personal Communicator.

The pen-based EO computer can transmit data over circuit-switched cellular voice frequencies and has a plug-in slot for a cellular phone. AT&T said EO would manufacture AT&T's personal communicators.

In mid-August, AT&T choreographed a plan to merge EO with GO, the Foster City, Calif., software developer that makes the PenPoint operating system for Intel Corp. processors and the AT&T Hobbit processor developed by AT&T Bell Laboratories.

GO's operating system is used in such personal communicators as NCR Corp.'s 3130 pen-based computer, IBM's ThinkPad and NEC Corp.'s VersaPad. Under AT&T's plan, which must be approved by the EO and GO boards of directors, GO will become an

See McCaw, page 114

## Brokers trade up to new net to handle increasing volume

BY BILL BURCH

Washington, D.C.

The National Association of Securities Dealers (NASD) last week awarded MCI Communications Corp. a \$150 million contract to completely redesign its on-line brokerage system to support a big increase expected in trading volume.

The redesign will increase reliability, bring new foreign sites into the fold and boost the speed of access to the network, which provides brokers with share price information and supports on-line trading. The overhauled network will be able to support a trading volume of 800 million shares a day, up from 250 million today.

The system currently operated by The

NASDAQ Stock Market, Inc.'s network subsidiary supports 3,800 subscribers, which use terminals or personal computers emulating terminals to access the network over 9.6K bit/sec multidrop lines.

Those lines feed into 18 network nodes around the U.S. that concentrate the IBM Synchronous Data Link Control traffic and transmit it over 19.2K and 56K bit/sec backbone links into NASDAQ's primary data center in Trumbull, Conn., and a backup data center in Rockville, Md.

Under the new network plan, brokerages will tie into MCI points of presence using 56K bit/sec digital links. Transmission Control Protocol/Internet Protocol traffic from broker workstations will be fed over T-1 or T-

3 lines from MCI into Digital Equipment Corp. routers at the NASDAQ network nodes, which will hand the traffic off to the data centers over 10M bit/sec pipes.

Given the intense competition among the association's broker members, the network is designed to ensure that all price and trade information gets to end users simultaneously. That is facilitated, in part, by the DEC routers, which will embargo data until all sites can receive it.

The transition to the new network will begin early in 1994 and is expected to be completed by the third quarter of 1995. Subscribers will be switched over to the new network by region, with users in the Dallas area migrating first. NASD will establish a node in London next year and plans to establish other nodes in Europe and the Far East.

Although the big increase in net capacity will initially triple the number of transactions that can be handled, NASD is already

See MCI, page 40

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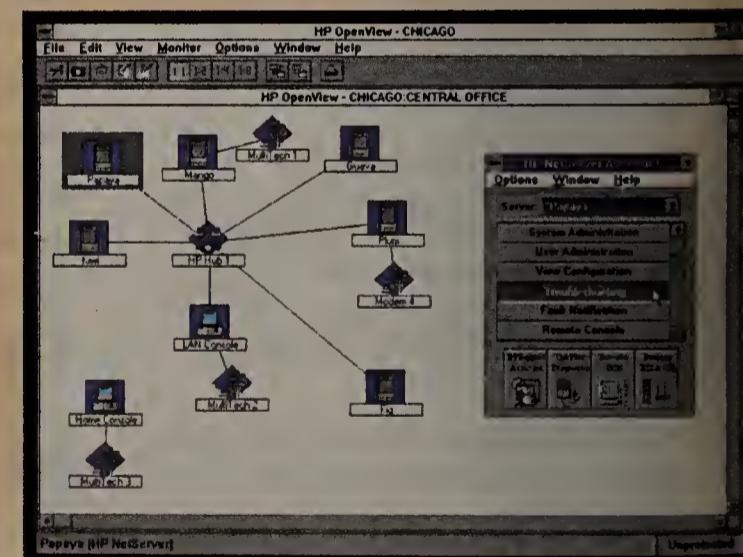
These new HP NetServers lead the pack in reliability. RAID-based disk arrays on the LM provide advanced fault tolerance. And, thanks to our hot-swap capabilities, you can now replace an internal drive without bringing the server—or your network—down. The array will also automatically rebuild data on a failed drive. And for maximum protection, the LM even supports Error Correcting Code memory. In fact, the more critical your data, the more critical these servers become.

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**\$4,849\***

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- 128-KB and 256-KB external cache
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- 8 EISA-2 with Enhanced Master Burst bus-master I/O slots
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- HP NetServer Assistant software included
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- Integrated Fast SCSI-2, IDE and video controllers
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- 3-year on-site, next-business-day limited warranty
- Tested and certified on major network operating systems

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\*U.S. list price for HP NetServer LM Model 530, including 486/33DX processor, 16-MB RAM and 535-MB SCSI hard drive. \*\*U.S. list price for HP NetServer LE Model 240, including 486/33SX processor, 4-MB RAM and 240-MB IDE hard drive. Prices subject to change without notice. Pentium and the Intel Inside logo are U.S. trademarks of Intel Corporation. ©1993 Hewlett-Packard Company PPG686

HP NetServer LE



**HEWLETT  
PACKARD**

# Encryption restriction policy hurts users, vendors

BY ELLEN MESSMER

Washington, D.C.

The U.S. government's policy of restricting exports of encryption hardware and software has hurt U.S. suppliers competing for business overseas while also creating hurdles for users that want to build secured global networks.

Strongly influenced by the U.S. Depart-

ment of Defense, which views encryption as a powerful military weapon, the federal government classifies encryption products as munitions, subjecting them to export controls the State Department admits are tougher than those for nuclear weapons.

But since encryption products are widely available from foreign producers, the U.S. pol-

icy has not put a lid on encryption but has instead served to punish U.S. industry and users that do business globally. The strictness of U.S. export controls has hobbled U.S. suppliers trying to sell to large corporate users with multinational networks or compete for foreign network contracts.

Under the federal government's rules, U.S. suppliers can only export encryption products to financial institutions after obtaining an export license, which can take months. If not in the category of financial services, the company located abroad must be at least 50% American-owned to qualify for receipt of controlled

encryption gear.

Semaphore Communications Corp., a Santa Clara, Calif.-based manufacturer of encryption products, estimates that U.S.-based vendors are not eligible under the export rules to ship encryption hardware and software to 403 of the so-called "Global 1,000" multinational companies named by *Fortune* magazine.

Even foreign operations of U.S.-based companies may fail to meet the export qualifications that govern the two most widely used encryption methods — the private-key Data Encryption Standard and the public-key system based on RSA Data Security, Inc. technology.

Semaphore, a Xerox Corp.-owned company, cannot sell to Xerox foreign operations in cases where Xerox owns less than a 50% stake.

The federal regulations on export have also hurt U.S. suppliers trying to compete for global network contracts.

"Many foreign-based procurements link the security specs with the specs of the complete telecommunications procurements," said Bill Ferguson, vice president of marketing and sales with Semaphore. The hassle and

## WHY BUY THE BRIDGE



### Members of the Industry Coalition on Technology Transfer

Aerospace Industries Association

American Association of Exporters and Importers

American Electronics Association

Computer and Business Equipment Manufacturers Association

Computer and Communications Industry Association

Electronic Industries Association

Information Technology Association of America

Semiconductor Equipment and Materials International

Semiconductor Industry Association

Telecommunications Industry Association

GRAPHIC BY SUSAN J. CHAMPEY SOURCE: ICOTT, WASHINGTON, D.C.

uncertainty of dealing with U.S. export regulation has driven bidders into the arms of foreign suppliers that do not face the same restrictions as their U.S. competitors (see graphic, this page).

Ferguson said his exasperation reached a peak recently when Electronic Data Systems Corp. (EDS) and NCR Corp. told him they would not specify Semaphore or AT&T encryption products in bidding last month for the Hong Kong Immigration Department's frame relay network because of U.S. export controls.

Instead, NCR and EDS bid encryption products from the British company Racal-Guardata plc and Swiss company Gretag Data Systems AG.

The frustration at Semaphore is echoed throughout the industry. Many vendors offered their viewpoints during a recent meeting of the Computer Systems Security and Privacy Advisory Board, a group chartered to advise Congress on security issues.

Ed O'Malley, director of corporate security for MCI Communications Corp., said his background as head of the Federal Bureau of Investigation's national espionage program in electronic transmissions has made him sensitive to national security concerns.

But O'Malley contends that the U.S. policy on encryption export damages U.S. competitiveness abroad. He added that he has been dis-

See Restrictions, page 43

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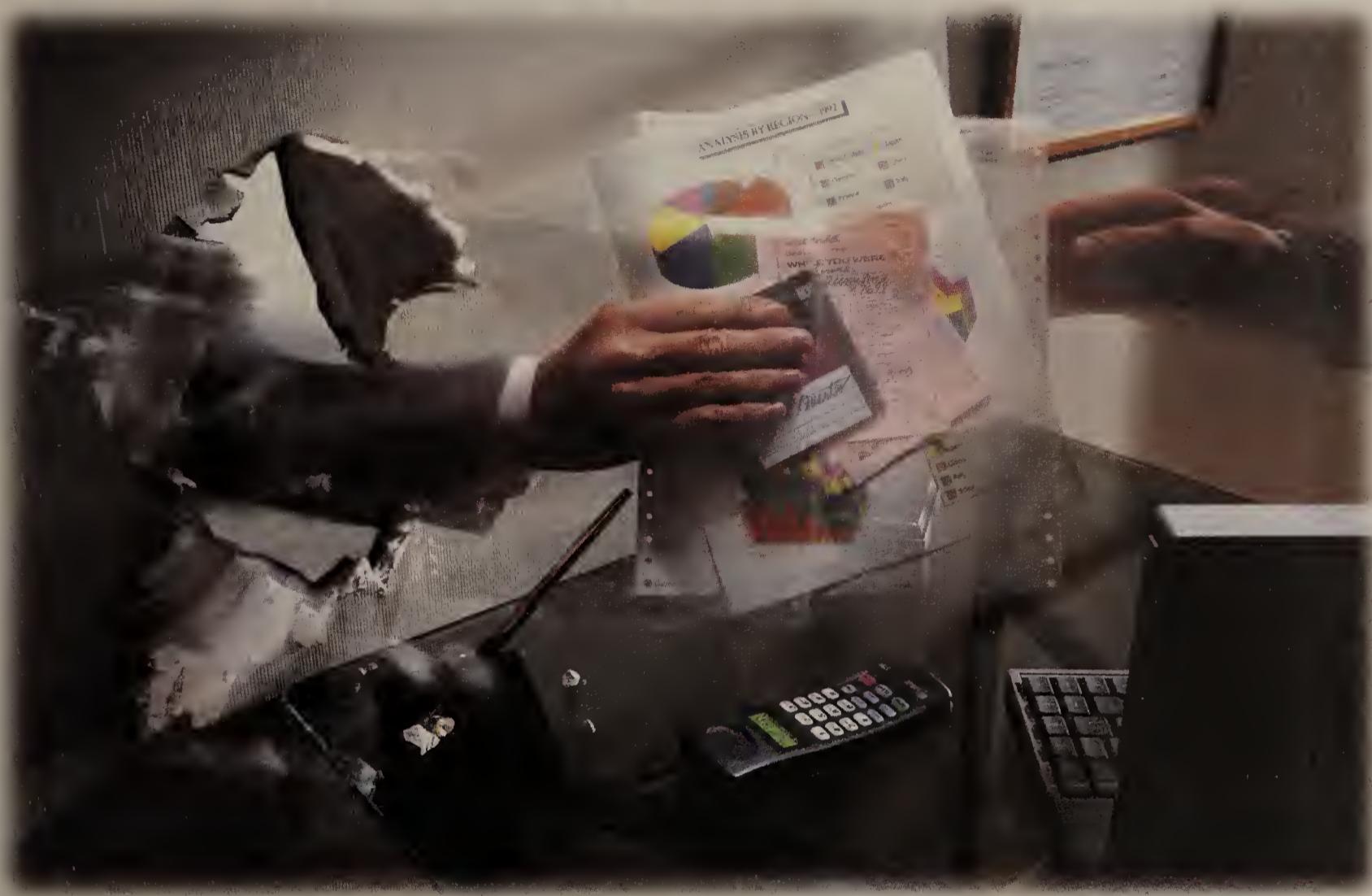
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# US West cuts SMDS rates, adds new speeds

BY BOB WALLACE

Englewood, Colo.

US West, Inc.'s Advanced Communications Services unit is awaiting regulatory approval to reduce the cost of its Switched Multigbit Data Service (SMDS) offering by roughly 25% and to offer the high-speed networking service at four new speeds.

Announced in June 1992, US West's SMDS is currently offered at 1.17M and 4M bit/sec from AT&T Network Systems Broadband Net-

speeds — 10M, 16M, 25M and 34M bit/sec — will make the switched data service attractive to a wider group of users.

One group of users the carrier is targeting specifically is companies looking for an alternative service for channel networking. US West will package SMDS with channel network equipment from Network Systems Corp. and offer integrated network design, installation and maintenance services.

Joe Zell, director of service development for US West, said the carrier's SMDS service has not been widely accepted to date, largely because US West offers other local-area net-

work interconnection services, including frame relay and its Transparent LAN Service (TLS), that have met users' needs.

"The vast majority of our customers use 56K bit/sec lines to link LANs," Zell said. "Those that need more bandwidth use TLS, which is often cheaper."

Announced last year, TLS is a fiber-based service that can be used to link up to 15 Ethernet and token-ring LANs in major metropolitan areas at 4M, 10M and 16M bit/sec speeds.

The plan to offer a channel networking package got the green light after US West concluded a six-month internal trial in which it

used SMDS and the Network Systems Corp. equipment to support that application. "We were very pleased with the results," Zell said.

Zell stressed that only some channel networking applications require 34M bit/sec and that others could get by with 25M bit/sec links. "A company may only need to establish a high-speed link between a mainframe and a high-speed printer."

US West's proposed price cuts and the new speeds are scheduled to take effect early next month.

©US West's Advanced Communications Services: (800) 328-2879.

## US West to cut SMDS rates

Current pricing	Per-access connection	
Access class (bit/sec)	Onetime	Monthly
1.17M	\$750	\$115
4M	\$750	\$766
Information transfer		
1.17M		\$493
4M		\$900
Proposed pricing		
Access class (bit/sec)	Per-access connection	
Onetime	Monthly	
1.17M	\$750	\$150
4M	\$750	\$463
1.17M Information transfer (total cost)		
1-2 destinations		\$298.07
3-8 destinations		\$376.33
Over 8 destinations		\$454.58
4M Information transfer		
1-2 destinations		\$821.05
3-8 destinations		\$936.66
Over 8 destinations		\$1,149.87

GRAPHIC BY SUSAN J. CHAMPEY

SOURCE: US WEST, INC., DENVER

working Switch-2000s in the carrier's top six metropolitan areas: Denver, Phoenix, Minneapolis, Portland, Ore., Salt Lake City and Seattle.

US West hopes the SMDS price cuts (see graphic, this page) coupled with the new

## BRIEFS

Continued from page 31

**McCaw Cellular Communications, Inc.** and **Pacific Telesis Group** have received regulatory approval for a cellular joint venture that will combine the carriers' cellular operations in Dallas, Kansas City, Mo., San Francisco, San Jose, Calif., and adjacent areas. The deal, which is expected to close in October, lets McCaw expand its cellular operations in Texas, California and the Midwest. Pacific Telesis will widen its operations in Northern California and the Midwest prior to a planned spin-off of its wireless operations in 1994.

**Racotek, Inc.**, the Minneapolis-based provider of wireless voice and data services, has reached an agreement with Motorola, Inc. under which Racotek will develop hardware and software that integrates Motorola's CoveragePlus wireless service with Racotek's RacoNet wireless metropolitan-area service.

The new offering, RacoNetPlus, will provide voice and data communications using Motorola's 800-MHz Specialized Mobile Radio system.

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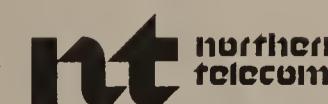
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# PSI unveils T-1 frame relay, IP encryption service

Morning Star router used to encrypt IP traffic.

BY ELLEN MESSMER

Herndon, Va.

Commercial Internet service provider Performance Systems International, Inc. (PSI) is boosting its frame relay service to T-1 speeds and offering a new service option that encrypts

frame relay traffic.

PSI's nationwide network, PSILink, which previously supported frame relay between 56K and 512K bit/sec for Transmission Control Protocol/Internet Protocol traffic, can now support T-1 speeds, as well, the company will

announce this week at INTEROP. The T-1 frame relay will vary from \$2,700 to \$3,400 per month per customer site, based on whether customers opt to purchase their own customer premises equipment or whether it is supplied by PSI as part of the service.

PSI last week said it will begin offering encryption of TCP/IP packets as a frame relay service option at all available speeds. The encryption service, called SecureStream for the InterFrame standard service, costs \$400 per month per site. The service includes installation and maintenance on customer sites of Morning Star Technologies, Inc. Express Rout-

ers, which can encrypt and decrypt data using the Data Encryption Standard (DES) from transmission to receipt.

"By offering high-level encryption at a reasonable cost, we feel SecureStream will provide medium-sized companies security in their Internet transmissions that was previously beyond their reach," said Martin Schöffstall, PSI's vice president and chief technical officer.

The Morning Star Express Router, which supports the Internet standard Point-to-Point Protocol and frame relay, is designed to encrypt IP data leaving the customer's Ethernet local-area network on its way to PSI's nationwide IP network.

Kim Toms, vice president of technology at Columbus, Ohio-based Morning Star, said the data encryption feature evolves around a pair of IP addresses — either computer-to-computer or LAN-to-LAN. Therefore, the user does not have to encrypt all of the data on the router but can selectively determine what traffic will be encrypted.

A separate DES encryption/decryption key, given to the appropriate users, is assigned to each set of IP addresses. The administration of the key-management system stored on files in the router is part of the SecureStream service offered by PSI.

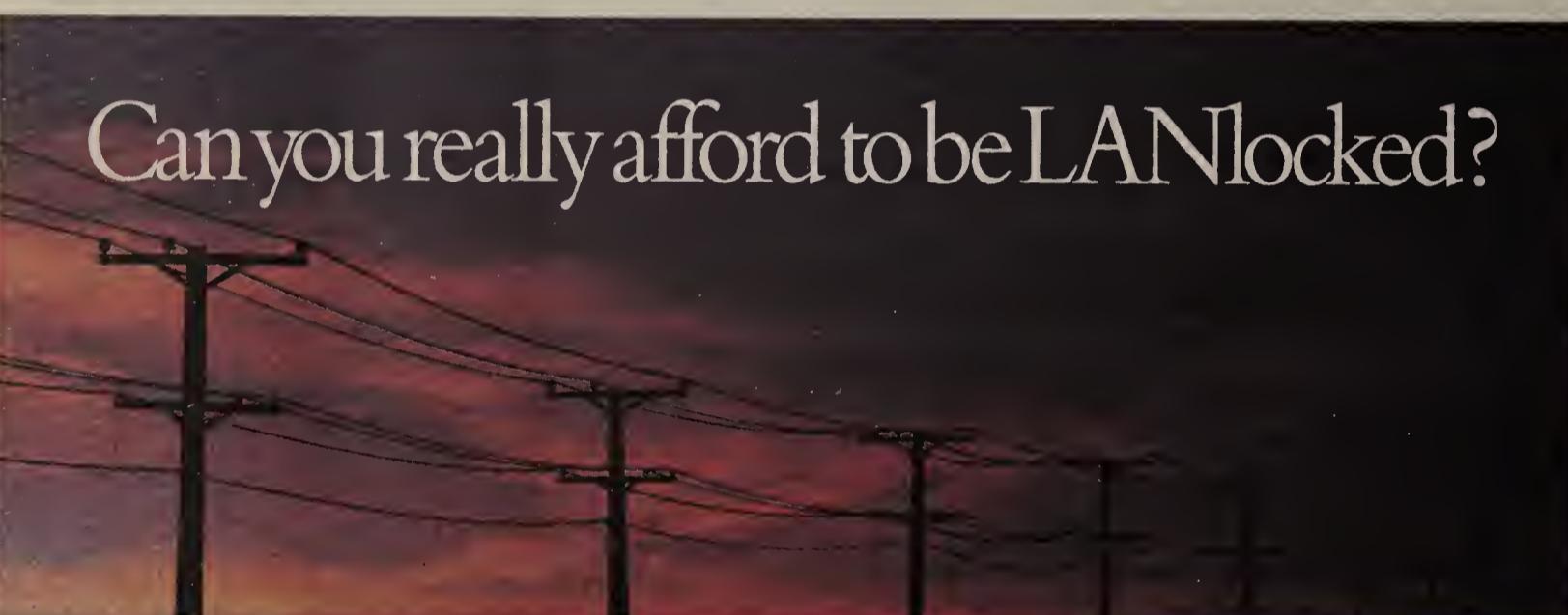
PSI is also reselling the Express Router for \$1,995 to companies that want to add encryption on their own.

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## MCI

*Continued from page 31*

planning for further expansion. For example, the network can be scaled up by setting up parallel data paths in the backbone using additional private lines.

The group is also considering using frame relay or Asynchronous Transfer Mode services to boost capacity.

In addition to increased speed, the network will be able to support new applications, such as document and image transfers, that NASD is considering.

"Stock transactions happen very rapidly and require extremely short transaction times," said Robert Bloom, telecommunications director for The NASDAQ Stock Market, Inc. "Images are almost like file transfers: They consume a lot of bandwidth for a long period of time."

"Those things were pretty much mutually exclusive in the old days," Bloom said. But ATM "would give the ability to both provide high-speed transactions as well as, in a sense, the equivalent of large bulk file transfers."

With NASD's market volume at 250 million shares per day and increasing, the association decided to bring in an outside supplier to take over the network.

Under the six-year contract — MCI's largest commercial data outsourcing deal to date — the carrier will install, operate and manage the network.

NASD considered bids from MCI and AT&T, which supplies private lines for the current exchange, but chose MCI for its lower price and better network design, Bloom said. □

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# Making multipoint video a reality

BY CHRISTOPHER FINN  
AND VANYA GALANIN

Multipoint videoconferencing — linking more than two sites into a video call — is taking off, and a growing number of users are faced with the decision of buying their own equipment or relying on carrier services to support multipoint sessions.

Either way, the trends look good for network managers. Prices have come down for multiconferencing units (MCU) (also known as multipoint bridges) and carrier bridging services. What's more, carriers are providing new options that mask differences between video systems, and emerging standards for MCU equipment are making it easy for users to link previously incompatible gear.

Established manufacturers, such as San Jose, Calif.-based Compression Labs, Inc.,

allowing, for example, a codec with T-1 access to converse with a codec using switched 56K bit/sec access — and codec conversion, which helps codecs running proprietary algorithms interoperate.

MCI Communications Corp. will soon offer bridging services as part of its VideoNet program.

The primary advantage of carrier bridging

services is convenience. A carrier develops profiles for videoconference participants within and outside of the company, including such parameters as the type of codec used and available bandwidth options. If the carrier has profiles for all participants, a user merely has to reserve time for the call.

"Starting out with multipoint via carrier services can save users a lot of grief," said

Doug Robertson of Video Booth, a Chicago videoconferencing consultancy. "By taking some of the complexity out of multipoint at the outset, companies can ensure a lasting commitment to the technology."

AT&T's pricing for bridging services is arguably the most simple. It charges \$1.04 per port per minute, with added charges for rate or codec conversion. If both rate and codec conversions are done, the user incurs only one additional charge. Usage fees are dealt with under existing customer long-distance plans.

Using this scheme, MCUs capability for a one-hour video call between three parties

## Multiconferencing service prices

Carrier	Service	Cost per hour
AT&T	Global Business Video Service	\$60*
Sprint Corp.	Multipoint Connection Service	
	112K bit/sec	\$45**
	336K or 384K bit/sec	\$60**
Carrier	Dedicated bridging service	Cost per month
AT&T	For 3 ports	\$3,450
	For 6 ports	\$6,555
Sprint	For 3 ports	\$4,140
	For 3 ports if brought under Virtual Private Network plan	\$3,450

\* Does not include cost of transport services to its Atlanta facility.

\*\* Plus monthly or hourly membership fee.

GRAPHIC BY SUSAN J. CHAMPEY SOURCE: TELECHOICE, INC., VERONA, N.J.

Danvers, Mass.-based PictureTel Corp. or Austin, Texas-based VTel Corp., sell multipoint bridges that support their proprietary videoconferencing systems.

Users can also buy stand-alone, standards-based MCUs from other suppliers, such as Lexington, Mass.-based VideoServer, Inc. These systems support multipoint videoconferencing among sites using different coder/decoders. AT&T Group Video Systems plans to add a standards-based MCU to its video product line by year end. CLI is reselling a VideoServer MCU that supports standards-based and proprietary algorithms.

Alternatively, organizations can pay an interexchange carrier to provide MCU capabilities on a pay-as-you-go or dedicated basis. The carriers maintain various MCUs at dedicated video centers and can reserve a number of ports as needed by customers.

## GETTING YOUR FEET WET

Most companies turn to the interexchange carriers first. "It's a toe-in-the-water approach," said Tina Mayland, director of sales and marketing for Sprint Corp.'s Sprint Video group. "The reason? Users aren't sure whether their multipoint usage will be enough to justify the cost of an MCU."

AT&T and Sprint offer a variety of bridging services at a range of bandwidths, including plain-vanilla video bridging without any speed or codec conversion. For an added fee, the carriers will deal with speed conversion —



using 112K bit/sec access — which can support full-motion video — would cost \$187.20.

Sprint's Multipoint Connection Service pricing is \$45 per hour per site for ports up to 112K bit/sec and \$60 per hour per site for higher bandwidths. As with AT&T, users pay additional charges for either codec or speed conversion but not both.

In most cases, it is possible to reserve a multipoint video call just 15 minutes before the desired time. Also, it is not necessary to schedule calls for half-hour increments. If a user wants to have a multipoint conference at 1:33 p.m., it can be arranged.

Despite increasing availability, users will occasionally find that their carrier does not have a free time slot when they would like one. Moreover, it may not always be possible to stretch a one-hour video reservation into one hour and 15 minutes.

For companies needing greater control over their video calling, the carriers also rent out dedicated port capacity. Renting port capacity by the month may also be a cost-effective alternative for companies that do a great deal of conferencing in a certain time period, such as an accounting firm during tax time.

Perhaps the greatest drawback to some

video services is the lack of any-to-any connectivity. AT&T does not currently bridge its subscribers with those using Sprint services, for instance, although Sprint will bridge its services with MCI's and AT&T's.

The alternative to carrier services is to buy your own MCU. That makes sense for companies that do a moderate amount of multipoint calling throughout the year or want complete control over their multipoint meetings. It is also a fit if you need unrestricted connectivity and have the appropriate technical resources on hand.

Although prices have been coming down

progressively, the current rule of thumb is that an MCU will cost \$10,000 per port. A four-port MCU that would accommodate the video call referenced above could also be leased for an annual cost of \$10,000, assuming that there is a five-year lease. Maintenance and service costs will add 10% conservatively, bringing the hardware cost to \$11,000 annually.

At \$187.20 per conference, a company will break even if it conducts less than 60 one-hour multipoint conferences, which is about one per week.

♦ Finn is a senior analyst and Galanin is an associate with TeleChoice, Inc., a Verona, N.J., consultancy specializing in strategic planning and analysis of intelligent networks, services and applications. They can be reached at (201) 239-0700 or on MCI Mail at DBRIERE (445-4690).

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## Restrictions

*Continued from page 34*

mayed by the "powerful confrontational tone between industry and government" on the issue.

Edward Regan, vice president of Chemical Bank, said global companies want to be able to use a single security system of their choice and U.S. regulations make it difficult to accomplish that.

As a representative for the U.S. Council for International Business, an organization of 290 large global companies ranging from banks to automobile manufacturers to telecommunications providers, Regan advocates abolishing the export controls.

"We feel competition of U.S. industry has long suffered with U.S. export law," he said, pointing out that the German Bundespost Telecom will soon go out to bid on an international telecommunications network with encryption, while U.S. vendors will not be able to bid because of the export controls.

The Industry Coalition on Technology Transfer (ICOTT), an umbrella group for 10 trade associations (see graphic, page 34), asserted that the National Security Agency (NSA) is the driving force behind the anticompetitive export policy.

The NSA "routinely recommends denial of exports of encryption to commercial customers, even those located in America's closest allies' [territories]," said ICOTT in its recent white paper titled "Encryption Export Controls."

Although a great deal of basic encryption technology was developed in the U.S., the NSA's actions have served to foster the foreign encryption industry, ICOTT concluded.

The U.S. Council for International Business came to a similar assessment in its own study, saying, "The logic of continuing such strict controls on certain U.S. exports seems flawed, and such controls should be abolished."

The White House this fall plans to unveil the administration's policy on encryption export controls following completion of a review undertaken by the National Security Council. "There's the realization there are competing interests that need to be addressed," said John Podesta, assistant to President Clinton.

But among both vendors and users, who say they are still in shock by the administration's unexpected Clipper Chip key-escrow announcement last April, there is little expectation that U.S. policy will be liberalized. □



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was a smarter,

and more cost-effective solution."

The answer was close to home. Even though Data Forms is one of the largest independent print distributors in New England, Ostrom was concerned about the level of data service he would get

from a national telecommunications company. "To them," says Ostrom, "we weren't important, because we weren't a big player. New England Telephone, however, has always treated us like their biggest, most important customer. Their service is unsurpassed."

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experts.**

The first step for the New England Telephone team of Pat Bollier, Senior Account Executive, Susan Delellis, Data Communications Manager,

and Paul Dimitruk, Staff Director, Data Sales Support, was to evaluate Data Forms' business and recommend a solution that fit their needs.

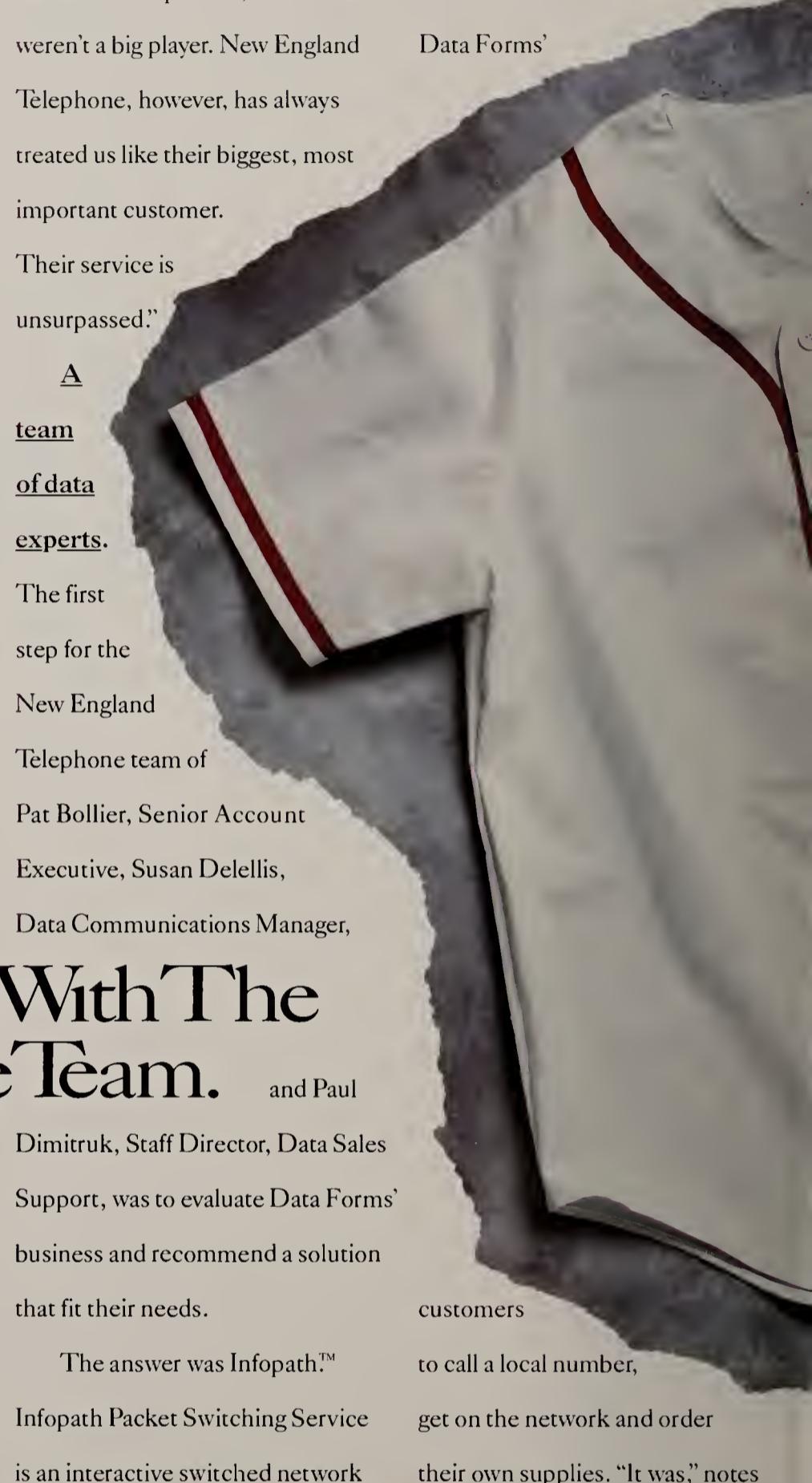
The answer was Infopath.<sup>TM</sup> Infopath Packet Switching Service is an interactive switched network

that allows users to access data directly from other computers and remote databases. It allows Data Forms'

customers to call a local number, get on the network and order their own supplies. "It was," notes

## By Going With The Home Team.

and Paul



Dimitruk, "the ideal choice, because it is more cost-effective

Data Forms is charged only when packets of data are transmitted, which is not the case with dial-up lines. Infopath has also expanded Data Forms' ability to handle simultaneous calls.

Previously, they could only handle 7. With Infopath, they can now manage up to 32 and can seamlessly grow to 500.

**Two companies, one team.**

According to Ostrom, the benefits of working with New

England Telephone can be divided into two equally important categories: technology and personal service. "It's as if

than the dial-up system they had before. And it's easier to manage." With Infopath,

Infopath were designed with Data

Forms in mind," he says. "It's the perfect fit. The same is true of all the New England Telephone people who work with us. They know us. They know our business. And they care about our business. If it's about telecommunications, we leave it to them, because they're the



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# Prodea to roll out new application development tool

BY BOB BROWN

Eden Prairie, Minn.

Prodea Software Corp. this week will announce a Windows-based software package for building custom programs by linking existing applications located on a desktop or across a network.

The company's new ProdeaSynergy software will give developers and power users a means of automating the flow of information between existing applications. The software will create links between them using screen-based icons and a drop-and-drag technique.

The software will link applications over local-area and wide-area networks and support existing communications specifications, such as the Vendor Independent Messaging specification and Microsoft Corp.'s Messaging Application Programming Interface.

ProdeaSynergy is the commercialized version of technology used by Prodea, formerly Information Synthesis, Inc., to build custom executive information and decision support systems for large organizations.

Company President Larry Barbetta said, ProdeaSynergy gives users the benefits of customized applications while leveraging their existing applications, hardware and nets.

ProdeaSynergy is used to build what Prodea officials call ProdeaSynergy Packages, which are created using existing applications, such as SQL database query tools, spread-

sheets and word processing applications. ProdeaSynergy Packages are created on a Windows-based Prodea screen by clicking on icons that represent each of the applications and drawing arrows between them to represent the flow of data.

In action, a user could launch a ProdeaSynergy Package and call up a database query tool, for example. The query tool would collect data from a database and the Prodea software would store it to a file. Next, a word processing file would be called up and the file previously stored would be inserted into the word processing document. The application would proceed from there as designed, possibly sending the resulting document to someone via electronic mail.

The product is designed for much broader application linking than Microsoft's Dynamic Data Exchange or Object Linking & Embedding technologies, the latter of which is limited to applications residing on a single desktop. But ProdeaSynergy does support both of these technologies and uses them where it makes sense to communicate between applications, Barbetta said.

ProdeaSynergy Packages can be developed with variable data paths. For example, a sales application could be designed to send a report congratulating field sales personnel if sales are

up or to send a memo to the chief executive officer if sales are down.

Descriptions of each existing application, such as Microsoft Word or Borland International, Inc. Quattro Pro, are stored in an Applications Services Database that can either reside on the client or the server. The descriptions of the applications — which can include the messaging application program interface they support, among other things — can be revised as new versions of the applications come to market.

Prodea supports all major desktop applications and designed ProdeaSynergy to be extensible to support custom applications, as well.

Users can create multiple ProdeaSynergy Packages at the desktop and store them in a ProdeaSynergy Library at either the desktop or on a server. The Libraries can be made accessible to multiple users.

Lee Allen, manager of decision support systems at Schering-Plough Corp., a large pharmaceutical firm in Union, N.J., said ProdeaSynergy has performed well during more than

three months of prototyping at his company. Schering may use the product to integrate applications such as database access and report writing, but Allen said he could see why a company could use the software "to facilitate the development of distributed applications."

ProdeaSynergy is available now and costs \$495 per copy. Under a limited time introductory offer, Prodea is offering users a \$200 rebate on the software.

©Prodea: (612) 942-1000.



BARBETTA

# GroupWare show fosters alliances

BY PETER LISKER

San Jose, Calif.

The recent GroupWare '93 show here was highlighted by the announcement of vendor alliances and the introduction of new products.

But while Apple Computer, Inc., Microsoft Corp. and other companies sought to explain their strategy vis-a-vis groupware, the light turnout on the exposition floor seemed to indicate there is a paucity of buyers for available wares.

The area of most interest, at least at the vendor level, was in imaging. Vendors in this arena stressed that the ability to integrate and move images throughout an organization will become a critical component in work group technology.

In one of the few bright moments of the show, WordPerfect announced its entry to the imaging market with a version of WordPerfect Office that will serve as a distribution vehicle for electronic images. The company also announced five imaging partners whose products will work with the image-enabled WordPerfect Office: Imagery Software, KeyFile Corp., PaperClip Imaging Software, Simplify Development Corp. and Watermark Software.

"A great deal of imaging technology is already available that allows users to scan,

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store and manipulate images," said David Clare, senior director of marketing workgroup applications at WordPerfect. "WordPerfect Corp. is concentrating its efforts on providing the technology to distribute images and image-enable the desktop."

WordPerfect imaging partners introduced key products at the show, including:

■ Imagery's FullView, which enables users to insert scanned, faxed or photo-CD images into Windows applications. With FullView, users will be able to transfer both black and white images between computers and across networks as easily as text information.

■ PaperClip's family of products allow users to electronically organize and manage office documents, including application files, faxes, electronic mail and scanned documents.

■ Simplify's MailRoom product allows users to combine images with documents using electronic mail and computer-based facsimile. MailRoom works with Simplify's network scanning product, ShareScan, which lets network-attached scanners be shared by multiple users, and turns a scanner into a shared network device that makes scanning affordable for every office user.

■ Watermark Software demonstrated its Discovery Edition software, which enables users to convert fax- or paper-based documents into images that can be incorporated into any OLE-compliant Windows application. Using the Watermark Software system, WordPerfect Office users can electronically view, route, make comments on, and file documents and faxes from within WordPerfect Office.

In another alliance effort, a group of 23 software vendors announced the formation of a

## Volkswagen

*Continued from page 45*

because after 20 years of applications development — with some applications on the IBM 3090 mainframe in Total, some in VSAM and some in DB2 — accessing information was quite complex.

With the new system, each evening's sales and financial data from dealerships is sent to the mainframe to update the transaction processing system, Buxton explained, and then it is fed to the DB2 corporate information database.

This, in turn, feeds an SQL Server database running under OS/2 on a 486-based computer dedicated to the EIS system. Buxton insisted on

coalition whose aim is to develop specifications that will allow different Work Flow Management products to interoperate in various key areas.

The group, called the Work Flow Management Coalition, held its first meeting last week during the Workflow Conference, which also took place in San Jose Aug. 12-13.

"The work flow management software market is going through a period of tremendous growth," said Regina Casonato, an analyst with the Gartner Group, a market research firm located in Stamford, Conn. "It can be anticipated that the Work Flow Management Coalition will have a major positive impact on the ability of users to exploit Work Flow Management technology for the management of their business processes." □

a dedicated server for this database to guarantee decent performance.

District managers are encouraged to dial in to the server at headquarters daily to update the data on their laptops. Updates can be accomplished fairly quickly because each user has files waiting that were generated the previous night.

The file generation feature in Lightship was another important consideration in its selection, Buxton said, because these files can be rapidly downloaded over the 2,400 bit/sec connections to the remote laptops.

### WHAT TO DELIVER

Apart from selecting the software and hardware for the system, another critical task was identifying what information the system should provide and how it would best be presented.

Buxton had the managers make a wish list of the information they wanted. Then she met with the people who were previously field operators and were now in support roles at headquarters, asking them to prioritize what information they believed, based on their experience, was needed.

"District manager was a new role, and it gave headquarters staff a chance to think, what does this person need from us?" Buxton said. "These people were also just coming to grips with their new jobs, and it helped increase the speed of organizational change."

She added that IS had never before involved that many people in the analysis phase of a project.

These discussions helped narrow the wish list down from what Buxton said would have

involved "just about all the information that was on the mainframe" to the six most critical pieces of information: vehicle sales, parts sales, market share and performance, fleet sales, market potential and customer satisfaction.

User involvement also entailed bringing in a full-time person who had previously been a field representative to sit with the IS team building the prototype front-end system. She provided input on how the district managers would be likely to use the system and what their preferences would be.

Buxton also worked with a trainer to design the course for the managers when the system was near completion.

The benefits of the new "EIS to go" system are hard to quantify, she said, because when the project was started, Volkswagen Audi had not done a strict business case, something they usually do. However, she said she believes the system has improved manager efficiency, effectiveness and professionalism.

The district managers are said to be making better use of their time, analyzing up-to-date performance data about dealers in their region, rather than combing through stacks of printouts for relevant information.

The laptops have also improved both the image they present to dealers and their ability to communicate with them: Rather than pointing to figures in a stack of printouts, they can show the dealers data in well-designed, graphical screen images either on-screen or in printouts they can leave.

—Heichler is a European correspondent for IDG News Service.

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# Firm announces new financial modules

BY PETER LISKER

Irvine, Calif.

Platinum Software Corp. has announced general availability of three new modules for its SeQuel to Platinum client/server financial software.

The new modules include Inventory and Cash Management, as well as SeQuel Publisher query and report generator. In addition, the company disclosed plans for the release of four new modules within the next two quarters.

The new modules round out the existing series of General Ledger, Accounts Payable, Accounts Receivable, System Manager and SeQuel Tools programs that have been available since the fall of 1992. The company said that, with the release of the newest modules, customers now have a comprehensive set of client/server applications to meet the needs of corporate finance workers.

The SeQuel to Platinum family of products is aimed at enterprise-wide accounting applications for large and midsize companies. The products are based on a client/server architecture and support Microsoft Windows and OS/2 Presentation Manager at the client level, and OS/2, Windows NT, NetWare and UNIX on the server side.

The software incorporates many of the fundamental technologies at the core of client/server, including an open relational database platform, advanced networking and communications, and industry standard user interfaces.

The company claims to have the largest installed base of any client/server accounting software, with more than 100 licenses of SeQuel to Platinum sold to date.

"Our customers can gain a competitive edge from our first-to-market status in their ability to implement a complete client/server solution well in advance of their competitors," said Gerald Blackie, Platinum Software founder, chairman and chief executive officer.

"We will continue to bring new products to market that address the financial management needs of corporations as they rely more heavily on client/server solutions for enterprise-wide systems."

By tracking multiple levels of identification of inventory items, the Inventory module gives users control over how closely inventory movement is monitored. Many inventory functions are tracked with this module, including setup, physical counts, converting purchase units to sales units and implementing pricing adjustments.

The Cash Management module offers automatic recording of cash disbursements and receipts. It can generate cash transaction and account balance reports and is also capable of reconciling general ledger cash accounts. The module includes a Cash Flow Analysis Report function that projects future balances against current outstanding payables and receivables.

In the critical area of data querying and report generation, the SeQuel Publisher module combines a WYSIWYG report generator with powerful data-querying capabilities to meet user needs.

Users can combine and import report information from a wide variety of server databases, including DB2 and those from Sybase,

Inc. and Oracle Corp. Optimized for Windows, support is also included for using Dynamic Data Exchange and Multiple Document Interface. This feature allows users to exchange information between desktop applications running in the Windows environment.

The new modules include the Multi-Currency General Ledger and Order Entry, which will be released in the fourth quarter of 1993, with Fixed Assets and Purchase Order modules available in the first quarter of 1994.

Pricing for Platinum Software SeQuel to Platinum modules ranges from \$50,000 to \$125,000 per module. □

## Object

Continued from page 45

which users are able to access and interact with data to accomplish a task or series of tasks.

For example, users may be able to dial up an on-line service that provides information about plays running in New York theaters. But rather than just obtaining data, the service will let users buy a ticket, make a reservation at a restaurant and book a flight to New York, among other things.

"People want access to information they

can instantly use. That's the model driving the information era," Walling said.

Walling said the big players in the information era will not be the hardware or software giants, such as IBM or Microsoft Corp., but rather information providers such as Dow Jones Information Service Group or Prodigy Services, Inc.

The computing infrastructure required to support the information era is radically different from today's mainframe or client/server environments, which rely on custom-built or packaged applications providing access to fixed fields or relational data, Walling said. The



### Evolution of information services

	1960s and '70s	1980s and '90s	2000+
<b>Hardware</b>	Mainframe	Client/server	Peer-to-peer
<b>Software</b>	Custom-made	Packages	Assembled
<b>Data</b>	Files/fields	Relational	Mixed-media
<b>Communications</b>	Terminal-to-host	LANs/WANs	Global
<b>Applications</b>	Stand-alone	Loosely coupled	Interwoven/invisible
<b>Investment</b>	Capital expenditure	Budget plan	Commodity
<b>End user</b>	Un-empowered	Functionally empowered	Informationally empowered

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open AIX/6000™ operating system. And it installs with just 6 clicks of a mouse. Now that's control.

It's also just the beginning. NetView/6000 offers open topology and dynamic discovery for the automatic mapping of both IP and non-IP devices. It can natively manage SNMP, CMIP and other protocols. And it provides an easy way to set thresholds, establish filters and automate responses to events. It even collects performance data so you can analyze overall network productivity and implement preventive maintenance. That's control with power.

And speaking of power, IBM supports NetView/6000 with powerful applications like System Monitor/6000 for distributed management and

Trouble Ticket/6000 for extensive problem management. For small businesses or remote branches with 32 nodes or less, NetView/6000 Entry is an effective, low-cost solution. And NetView Service Point offers two-way communications with NetView on the host. That's control with power and flexibility.

For enhanced support and customization, IBM has established the NetView/6000 Association. This impressive list of leading hardware and software developers continually adds to the growing number of robust solutions that are rapidly helping NetView/6000 emerge as the management platform of the future. That's control with power, flexibility and support.

era will be marked by computers interacting as peers across a global network that supports voice, data, image and video with ease (see graphic, this page).

One of the biggest changes will be in the way software or applications are constructed. Whereas packaged software has come to dominate the industry today, in the future, applications will cease to exist, Walling said. In their place will be networks of well-designed objects that can interact in real time to meet end users' information needs.

"In an object environment, you no longer have applications, you just have objects behav-

ing," Walling said.

Today, programmers create applications from scratch by writing new code and occasionally reusing existing modules of codes or objects.

However, in the information era, IS departments will simply establish connectivity between objects to meet users' information requests or requirements. A single object, such as a ledger, will not be duplicated or reused in separate application processes but will be made available to all users through a virtual network.

The virtual object environment also significantly changes the role of IS, Walling said. Instead of creating applications, the IS department's main function will be to manage the objects' network, not the objects themselves. This is similar to telephone companies, which manage network switches and connections, not the content of end-user calls.

Passage to the information era will involve significant cultural and organizational change that will require strong leadership from IS and business managers.

"The evolution of IS is about major change. Unfortunately, our very success [in the current IS paradigm] makes us resistant to change," Walling said. □

## Enterprise

*Continued from page 45*

message counts, errors and other performance statistics.

The ES/MTA runs on Unix server software from Hewlett-Packard Co., IBM, NCR Corp., Novell, Inc., The Santa Cruz Operation, Inc. and Sun Microsystems, Inc.

### X.500 PACKAGE

The firm will also announce a complete X.500 package comprising the ES/Directory Service Agent (ES/DSA) and ES/Directory User Agent (ES/DUA).

The ES/DUA is end-user software that enables users to look up E-mail user listings maintained on Unix servers using the ES/DSA component.

Listings can be identified by entering even part of a user's name or organization; the X.500 directory server does the rest.

The ES/DSA is tightly integrated with Enterprise Solutions' X.400 user agent software, allowing for addresses looked up in the directory to be automatically input into the outgoing X.400 message.

The ES/DSA runs on the same Unix software platforms as the ES/MTA. The ES/DUA runs on Unix (with a character-based interface), DOS and Windows clients, and will run on Apple Computer, Inc. Macintosh and Motif-based Unix clients by year end.

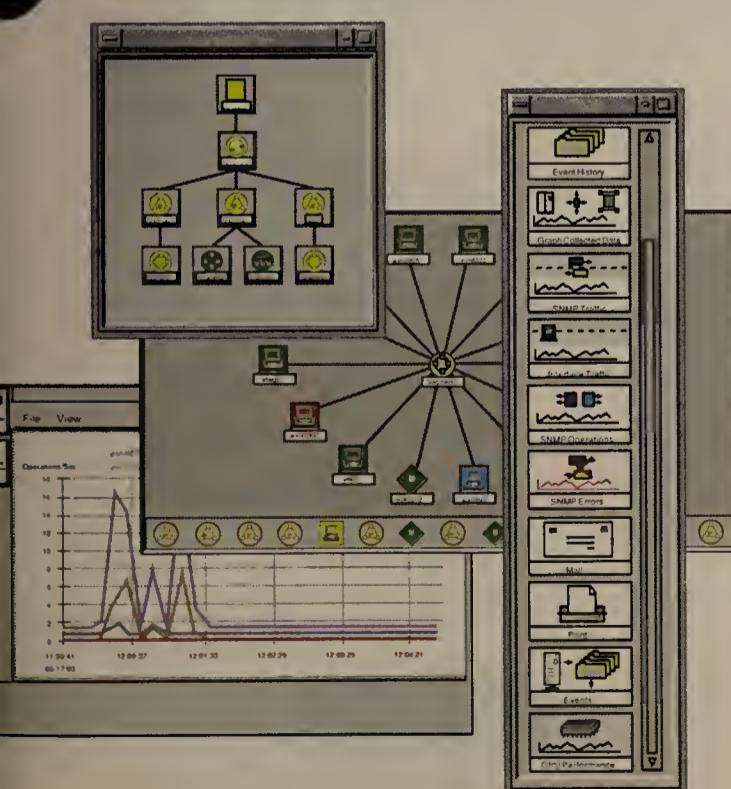
### E-MAIL APPLICATIONS

Enterprise Solutions has also teamed up with two other vendors to offer a pair of mail-enabled applications. It teamed with Keyword Office Technologies, Ltd. to offer a Document Conversion Package based on Keyword's Key-pak product to enable users to convert incoming messages into their own application format, such as a specific brand of spreadsheet.

And it partnered with System Compatibility Corp. to create Document Viewer, software that enables users to view incoming messages in the same document format in which they were generated.

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white paper



## Network Reengineering for Competitive Advantage



ILLUSTRATION BY NIKOLAI PUNIN

# NETWORK REENGINEERING

## BUZZWORD NETWOR IMPERATIVE?



**Network  
reengineering  
refers to  
activities that  
significantly improve  
the network's ability  
to support  
ongoing changes  
in business processes  
and systems.**

### Background

Faced with an increasingly competitive world economy, business organizations have drastically changed their strategies and structures in the past few years. But there has been an unfortunate lag between changes in businesses and changes in the networks that support businesses. This is because today's networks were built for yesterday's organizations.

Yesterday's organizations were typically hierarchical in structure, with lines of communication ordinarily running in one direction (top down) and little coordination between divisions. The networks that many organizations built, and are still burdened with today, were developed for such organizational structures.

Faced with increasingly intense competitive pressures, businesses are making many organizational changes. Hierarchical structures are being replaced with distributed decision making, and "empowering the employee" is the motto of many chief executive officers. What does this have to do with network reengineering? Everything.

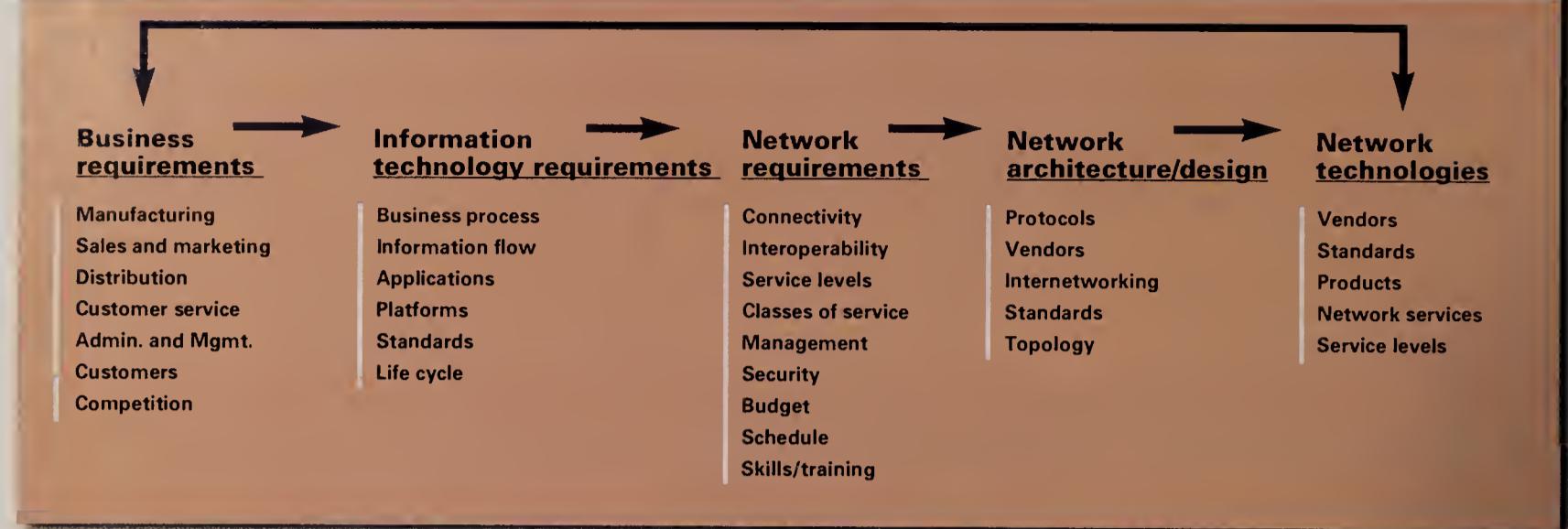
### Business-process reengineering is the driver

The Yankee Group defines network reengineering as "the remodeling of the network to enable and support the reengineering of business processes and systems." Businesses are evolving rapidly, and yet the network is often the last part of the business to catch up with important changes. Network reengineering refers to activities that significantly improve the network's ability to support ongoing changes in business processes and systems.

When an organization embarks on a significant new strategy, such as distributing decision-making authority to different divisions, the business is often reorganized to support the new direction. Employees are assigned to new groups, and new lines of communication are established to create an organizational structure that supports the new business strategy. But all too often, the network that supports the business and its processes is not changed until signs of strain are evident — for example, users start complaining. Changes in network structure are just as critical as changes in organizational structure when successfully implementing new business strategies. Indeed, the network can be as much an impediment to success as the organization's distribution channels if they were not adapted to support the new strategy. Figure 1 presents The Yankee Group's view of the network reengineering process, driven by changes in the organization's business requirements.

Reengineering the network to increase reliability and efficiency is not enough. Companies that focus on only these areas will neither be realizing the benefit nor the success. Successful companies will reengineer the elements of their network capable of helping them achieve their business goals.

Network reengineering process (Figure 1)



SOURCE: THE YANKEE GROUP

### Expecting the unexpected

In organizations where the network has been an impediment to business requirements, there is a clear need to reengineer the network. As any network manager can attest, unexpected demands on network resources are the norm, not the exception. Unfortunately, it is difficult to respond both quickly and adequately to unexpected demands, making the Network IS professional's job extremely difficult.

Consider the scenario where a company's biggest competitor has just introduced a new product. The new product is meeting with great success, so senior management decides it must develop a similar product soon to protect market share. To develop the new product quickly will require unprecedented levels of coordination between the engineering and manufacturing groups. To help with this coordination, a new project management application has been deployed by the two groups, but it involves very large file transfers. The current network's bandwidth capacity will result in unsatisfactory response times, which, in turn, will result in a barrage of complaints once these files start changing hands. In this scenario, the network becomes a hindrance, not a tool. And the Network IS professional is faced with deploying new network resources without having sufficient time to evaluate alternatives.

In another scenario, an organization's manufacturing group has decided to implement an improved just-in-time strategy — one that will require electronic links to suppliers. This new strategy may be the result of a significant new customer contract that stipulates specific delivery schedules from time of order — for example, the product must be delivered within two weeks of order. Unfortunately, manufacturing did not check with Network IS before agreeing to this requirement. Now the Network IS professional is faced with the task of establishing links with outside suppliers in an impossibly short time frame.

These two examples illustrate how network investments are often made in response to specific situations, not in anticipation of them. When this is the case, it is almost impossible to satisfy the business' requirements adequately, and it is extremely unlikely that decisions will be made with long-term strategy in mind. Through network reengineering, it is possible to create a utility that is ready to respond to such unforeseeable changes in business demands on the network. Expecting the unexpected can become a strategy, not an oxymoron.

### Buzzword or strategic imperative?

Many organizations are involved in business-process reengineering. It may be called different things — downsizing, rightsizing or simply restructuring — but fundamentally, it's all the same. And in most cases, the goal is the same: to make business organizations more competitive by improving quality, reducing costs and shortening product development cycles.

Businesses are making many changes to remain competitive. Each of these changes has a direct impact on information technology and demands on the network. Figure 2 identifies what The Yankee Group calls the "reengineering domino effect." The effect is a change in network requirements and technologies driven by business and information technology trends.

Network reengineering is not just a buzzword. It's a necessary direction for any organization that expects to achieve its goal of becoming more competitive. And any skeptic need only look at the current activities of the largest, leading-edge user organizations in the U.S. for evidence of the network reengineering trend. In a survey of 224 Network IS professionals, The Yankee Group found that the No. 1 change in networks that will occur in the next five years is "network reengineering," followed by "expanding geographically" — a distant second.

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**The network reengineering domino effect (Figure 2)**

Business driver	Information technology reengineering trend	Network reengineering requirements	Network reengineering technology options
Distributing business and operational responsibility	Distributed systems, client/server virtual work groups	Any-to-any, peer-to-peer connectivity across heterogeneous environments, LAN integration	
Linking with trading partners	Electronic links to trading partners, interenterprise applications and information systems	Affordable connectivity to other enterprises, standards for interoperability, bandwidth on demand	EDI, electronic funds transfer, X.400, gateways, frame relay, Switched Multimegabit Data Transfer, Global Directory
Reducing operational costs/increasing liquidity	Information technology reengineering, data center consolidation, network consolidation, downsizing, outsourcing	Collapsed backbone, high-speed channel connect, multivendor internetworking, network partnerships, LAN integration	
Competing in a global economy	Distributed information systems, integration, operational integration, enhanced messaging	Any-to-any connectivity, reliable, affordable bandwidth, centralized network mgmt., LAN/WAN integration	Internetwork gateways, international virtual network services, managed network services, SNMP network mgmt.
Integrating enterprise business operations and knowledge workers	Cross-functional systems integration, cross-platform interoperability, multimedia messaging, virtual work groups	Any-to-any connectivity internetworking bandwidth on demand, network interoperability, integrated network mgmt., LAN integration	Middleware, X.400, SNA gateways, Lotus Notes, multiprotocol routers, frame relay, SNMP network mgmt., Global Directory Service
Decreased time to market/shrink product development cycle	Distributed image processing systems, interenterprise information systems, enterprise system integration, messaging	Any-to-any connectivity, LAN-to-LAN internets, bandwidth on demand, videoconferencing, network extended to trading partner	Multiprotocol routers, bandwidth on demand, network services, gateways, middleware EDI, X.400, smart hubs, Global Directory Service
Improve product quality, meet quality standards	Integrate functional business systems, build measurement and feedback systems, integrate with suppliers	Internetworking, extend network to suppliers, LAN/WAN integration	Multiprotocol routers, gateways, EDI, X.400, virtual network, smart hubs

SOURCE: THE YANKEE GROUP

### Network reengineering goals

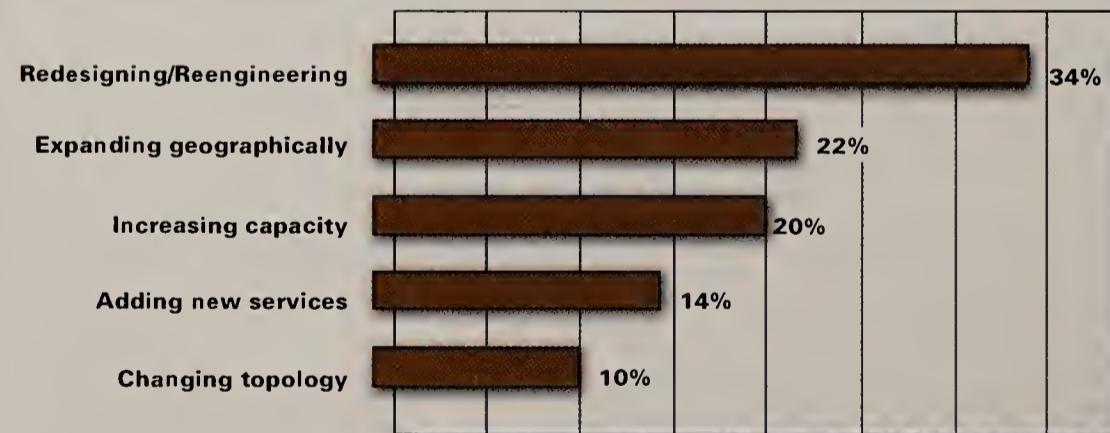
The goal of network reengineering is to derive competitive advantage. The competitive advantage will come from investing in a network infrastructure and organization capable of meeting constantly changing business requirements faster, and better, than the competition. The reengineered network will be the organization's most important service — more important than its assembly lines, shipping center, warehouses, retail stores or any other service that is part of the product delivery process.

Ultimately, this means the broad goal of reengineering is to create a "generic network" to replace the "brand-name network" that limits growth and competitiveness. The brand-name network relies on proprietary technologies and rigid structures, while the generic network is a flexible architecture that can respond to changing requirements and technology alternatives. This new network requires standards, application program interfaces (API), support for multiple protocols and complete independence from a single vendor or technology.

A generic network, for example, is one where all major protocols are combined over a wide-area network backbone, and desktop devices and servers are connected to the local-area network and WAN, regardless of vendor, protocol, interface or location. Each department's wiring closet is likely to have a smart hub that provides network service distribution and management. It also likely contains bridge/routers.

Obviously, the creation of such a network has broad implications for the organization's business capabilities. While some people use the term "virtual corporation," The Yankee Group believes this is too limiting. Referring to the corporation overlooks one of the key aspects of the emerging network architecture: intercompany communications. The ability to link to trading partners and customers as easily as linking previously isolated work groups will be a major requirement for many organizations. The term "electronic enterprise" more accurately captures the true nature of the evolving network facility and the organization it will empower.

**Users define five-year network changes (Figure 3)**



SOURCE: THE YANKEE GROUP

## Reengineering benefits

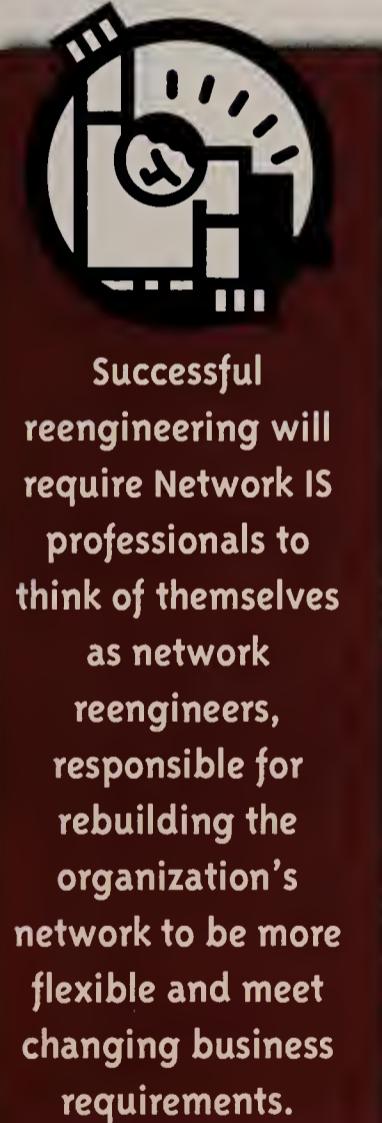
Successful reengineering will result in a more adaptable network. The network must be able to adapt to changes in business processes and systems quickly — transparently — to the business' employees.

The Yankee Group's research shows that communications executives see a strong relationship between business objectives and the network. When asked which business changes will affect the network, top responses included "improved customer service" and "global competition." Clearly, these professionals believe that the network must be reengineered to achieve these business benefits.

## The emergence of the network reengineer

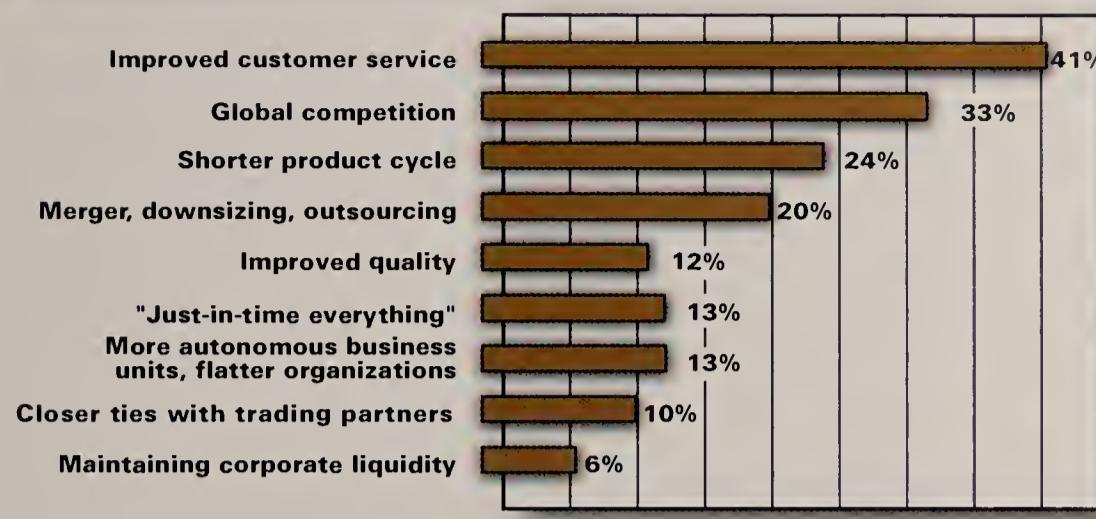
For network reengineering to be successful, commitment must come from the highest levels of the organization. Reengineering is a costly and resource-intensive process. It is also a long-term commitment — its benefits can't be neatly measured in six-month payback cycles like a hardware purchase might be.

Successful reengineering will require Network IS professionals to think of themselves as network reengineers. They will be responsible for rebuilding the organization's network to be more flexible and meet changing business requirements. The primary goal of the network reengineer will be to facilitate enterprise integration — identified as the No. 1 goal for 1995, according to chief information officers in a study conducted by The Yankee Group last year.



**Successful reengineering will require Network IS professionals to think of themselves as network reengineers, responsible for rebuilding the organization's network to be more flexible and meet changing business requirements.**

## Business changes that affect the network (Figure 4)



SOURCE: THE YANKEE GROUP

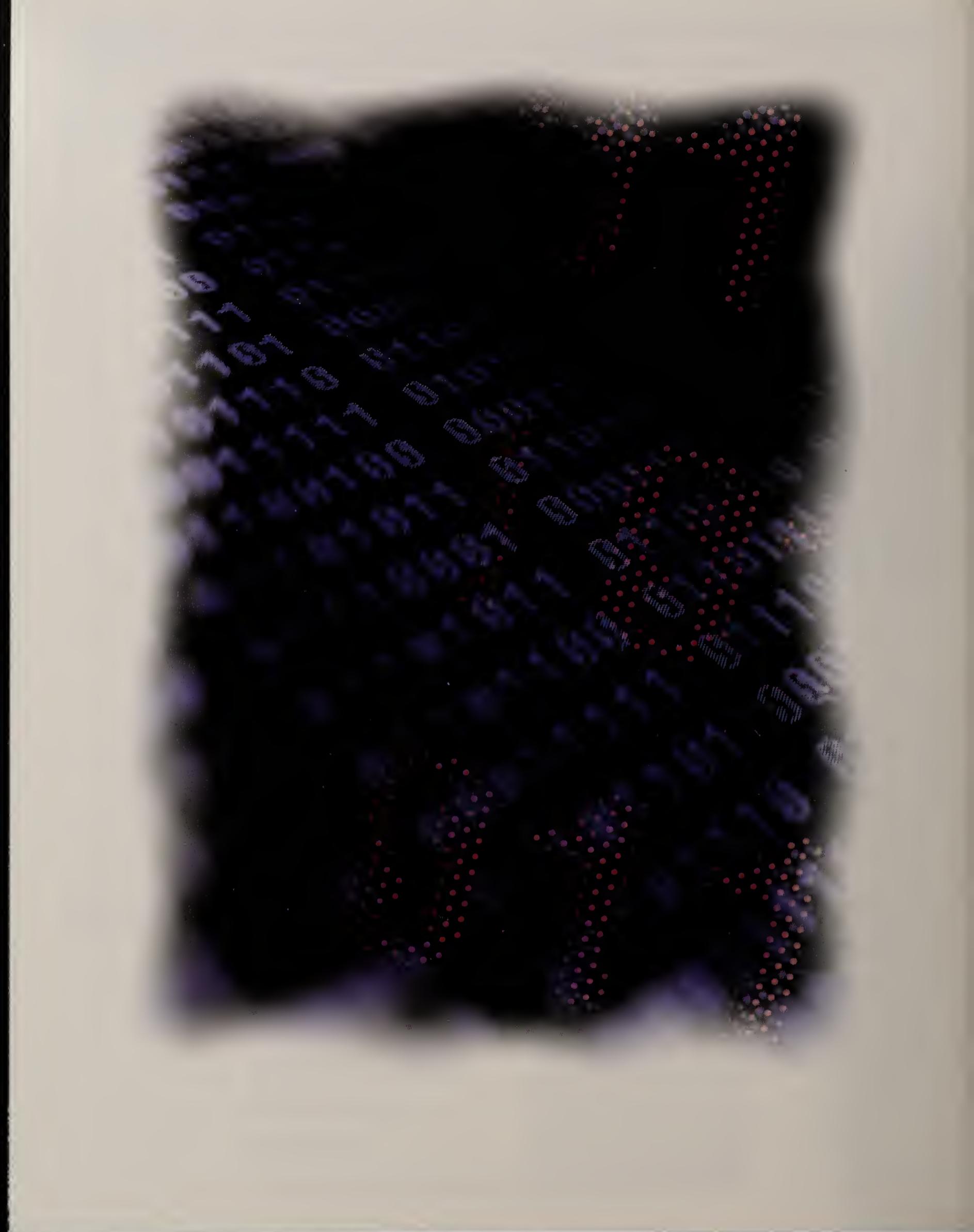
In addition to remodelling the network, the network reengineer is responsible for identifying the parts of the network that can be outsourced — and for maintaining outsourcer relationships. Indeed, one of the network reengineer's key tasks will be to refocus networking efforts on areas that deliver the greatest return and divest other areas to qualified outsourcers.

The network reengineer will find many highly qualified sources for outside help. Reengineering help may be closer than you think. Many companies are looking to capitalize on this significant new trend, including one that may already be as close as your wiring closet. The local telephone companies are leveraging their wide variety of services to offer reengineering. Local carriers can provide multiple tools for reengineering, including

many services for interconnecting LANs, bandwidth on demand and even management services.

Carriers today also provide LAN integration services. Using one or a combination of data services, such as frame relay, Switched Multimegabit Data Service (SMDS) or Integrated Services Digital Network (ISDN), carriers provide LAN integration by combining customer premises equipment leasing — such as bridges or routers — installation and WAN connectivity. Both small and large businesses can benefit from the resource that carriers represent.

Any network reengineering process that involves a metropolitan or wide area network should include the carriers from the beginning. Carriers today offer an incredibly wide array of services: ISDN Basic Rate Interface and Primary Rate Interface, leased-line services, switched high-speed digital service, frame relay, SMDS and, in the foreseeable future, new Asynchronous Transfer Mode (ATM)-based services. Network IS professionals can look to the carriers to provide much of the required resources — even remote network management — so the organization's resources can focus on applications.



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## A new network model emerges

Network reengineering will lead to a new architecture that will consist of four basic elements:

- Bandwidth on demand to the work groups — however they are defined — supporting a range of distributed and scalable applications.
- Any-to-any connectivity between groups, applications and computing platforms.
- The extension of this technology on a global scale so it can penetrate corporate or national domains as needed.
- Interoperability — seamless, transparent and easily managed — between networks.

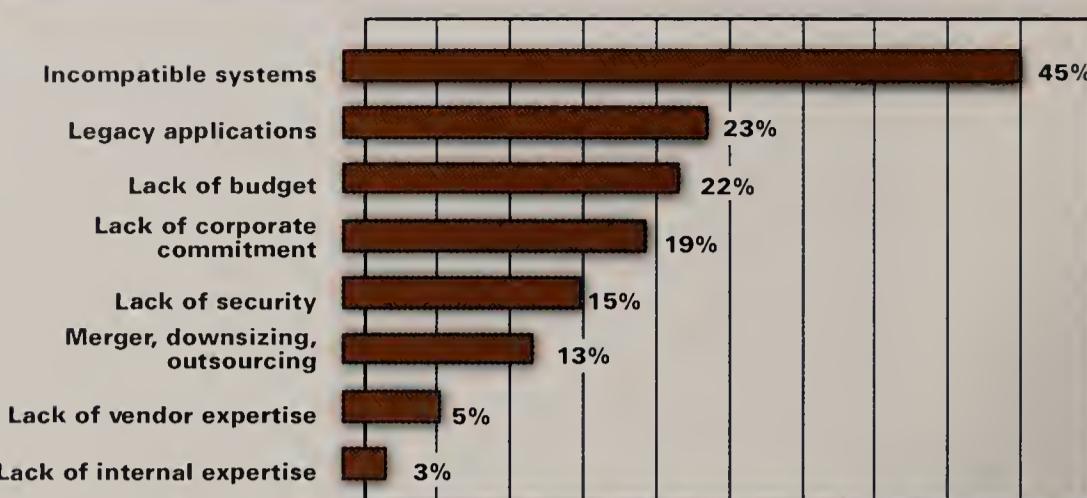
These changes mean the mix of products and services used in networks will shift dramatically. The Yankee Group believes in-house efforts will focus on applications, and network services will play an increasingly large role to alleviate time and resource demands.

Obviously, the new architecture will not come quickly. Companies will have to make a commitment and be willing to make significant changes — slow, gradual strategies will not work here. Decisions must be made, and often on a grand scale.

Technical challenges exist. The existence of multiple architectures, various protocols, diverse interfaces and the sheer number of vendors are all impediments to enterprise integration. The Yankee Group research shows that a typical large organization has relationships with 110 different vendors — mainframe, personal computer, software, customer premises equipment and carriers. The lack of standards between different vendors' products is a major hurdle and the most common impediment to enterprise integration. In fact, in a survey of the Yankee 200, the No. 1 barrier to network reengineering was "incompatible systems."



## Five Most Difficult Barriers Users Face Employing Networks with Trading Partners and Customers (Figure 5)



SOURCE: THE YANKEE GROUP

Several technologies will be key in overcoming these challenges and achieving the new architecture. First and foremost is the LAN, which is becoming the agent of change for overcoming interoperability impediments.

Another major facilitating technology will be messaging. Electronic messaging can encapsulate a wide variety of information and guide it around the network. This may prove to be a reasonable solution to the problem of application-to-application communications, as well as personal communications. Electronic messaging may prove to be the purest form of enterprise-wide application.

Open systems, client/server computing and specific technologies such as gateways are also key building blocks. Of course, gateways are an interim solution — they are good at connecting a LAN-based work group or getting access to mainframe-resident data, but that's only two of many connectivity challenges that a large business must face.

In addition, new technologies such as distributed applications, Lotus Development Corp.'s Lotus Notes, video conferencing and work flow software

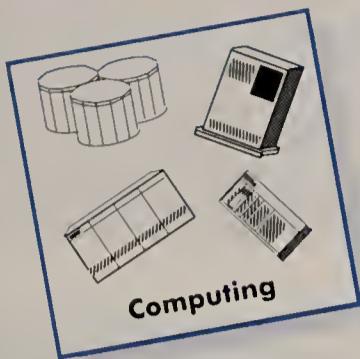
enable "virtual work groups" to exist. No longer do employees have to be physically collocated to work as a cohesive team. Work groups, whether temporary or long-term, can be created without regard for physical proximity. This is a requirement that will become increasingly common. Consider the case of one of the top 1,000 electronics companies, which has a design team with personnel located on three continents and in 12 time zones, yet the team is able to share information, access shared simulation systems and engage in meetings.

Products that create a seamless internetwork from a collection of otherwise disparate systems will be in high demand. This will mean continuing growth in the already burgeoning hub and router markets.

Further, new technologies such as Fiber Distributed Data Interface (FDDI), SMDS and, ultimately, ATM will create new internetworks that make users appear to be on LANs. That is, with new high-speed technology, users on physically separate systems will "feel" as if they were locally connected. Thus, FDDI concentrators, SMDS data service units and ATM-based router/hubs will all become significant markets over the next five years.

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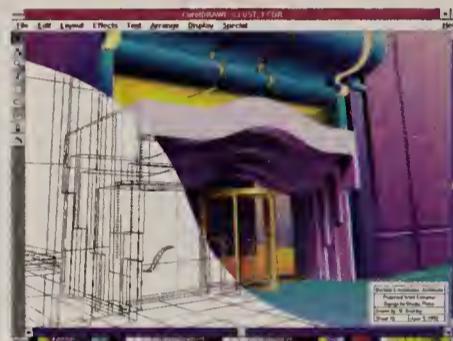
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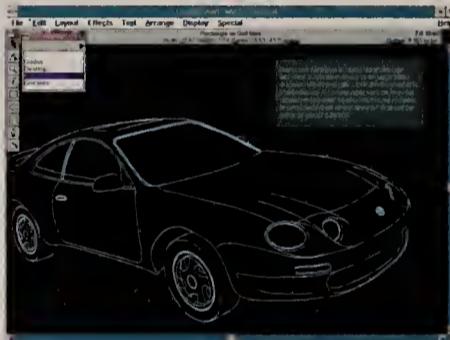
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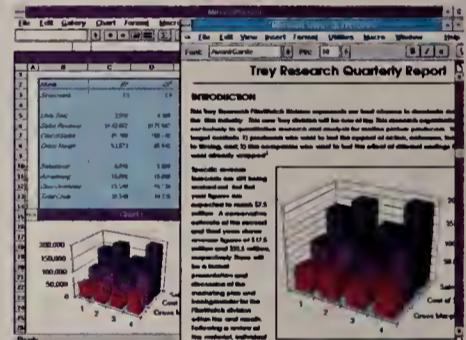
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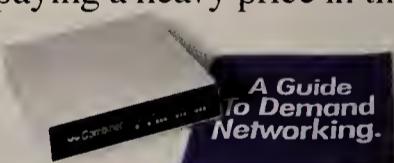


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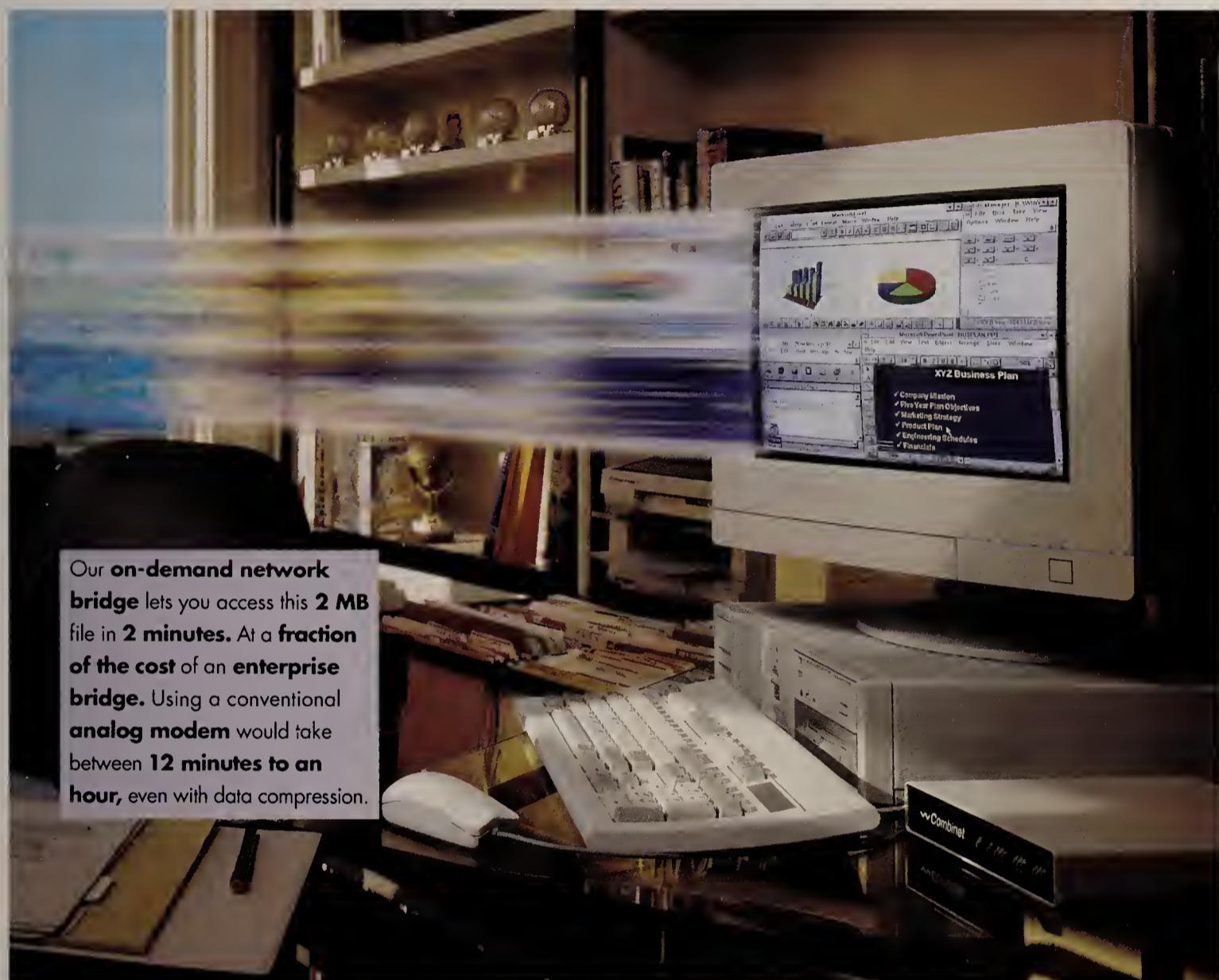
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## Don't look now

In reality, most organizations are already involved — at least to a small degree — with network reengineering. Even if there is no formal reengineering plan, it is often captured in other network-related activities. Remember, the concept of network reengineering does not require that it be formalized — although it is recommended. The only requirement for reengineering is that the network evolve to better meet business needs. Therefore, Network IS professionals involved in any of the following activities are probably involved in reengineering:

- **Deploying switched bandwidth in the LAN.** Many organizations are replacing traditional, shared media LANs with switched LANs, such as Ethernet switching. This is an important step toward realizing bandwidth on demand.
- **Building a multiprotocol WAN backbone network.** The popularity of multiprotocol routers in large networking organizations shows the need to provide any-to-any connectivity across disparate LAN environments.
- **Linking to trading partners.** Using electronic data interchange (EDI) or electronic mail to support relationships with customers and suppliers is clearly an important business strategy.
- **Deploying a middleware solution.** Employing API's, gateways and multiprotocol support, middleware enables a user to establish a certain degree of portability and interoperability across network and computing environments.
- **Integrating SNA and LAN internetworks.** Connectivity between previously disparate systems is an essential part of overcoming information-flow barriers. The common approach is to establish gateways between the Systems Network Architecture and multiprotocol environments.

This White Paper was written by **Todd Dages, V.P. Communications, Research and Consulting** of The Yankee Group in Boston, MA. For more information contact Evilee Thibeault at 508-875-6400.

## Citicorp: Reengineering in real life

The financial services industry is one of the fastest changing — and most fiercely competitive — markets in the world. As a giant in the industry, Citicorp deals with the demands of increasing international operations, shrinking resources and an overall increase in complexity. All of these changes result in a need for faster, more responsive information systems.

Citicorp embarked on a network reengineering effort on a scale that cuts across divisional boundaries. An overall goal was established early on in the process: to provide cost-effective, high-quality, scalable, highly available, high-speed and secure network services that offer applications a set of standard network service interfaces for all business transactions, irrespective of application and network infrastructure.

Citicorp's current network had been architected for terminal-to-host connectivity — a far cry from its previously ambitious goals.

To achieve its reengineering goals, Citicorp will consolidate three key functions of each network technology — security, directory and management — into a single service architecture. This will make it possible to provide real-time network paths among application resources, databases, servers and clients that can be managed from a central location under a single management umbrella.

Reengineering efforts will rely heavily on various standards, including Open Systems Interconnection, X.400, X.25 and developing standards such as X.500. For example, an X.400 message service will transfer messages between E-mail systems, with gateways to external mail and value-added processing such as format conversion and message repair functions.

Citicorp views network reengineering as long-term strategy and has specific phases planned out as far as 1997. This long-term view is critical and reflects Citicorp's commitment to reengineering as a continuous process.

## Practical advice for end users

Network IS professionals contemplating reengineering as a strategic direction can consider the following practical advice.

Reengineers must be willing to make decisions about which parts of the network to focus on and be willing to outsource the rest. This will help to reduce costs and allow network reengineers to focus on resources that will deliver the greatest return.

When looking for outside help, consider regional and long-distance carriers for a wide variety of services. The carriers are no longer solely voice authorities — they have invested substantially in data services and have a great deal of time-saving services to offer.

Reengineers should plan for, and expect, continuous change. Network reengineering is not a process that lasts six months, 12 months or even two years. It's an ongoing process, and the organization must recognize this up front and not set unrealistic expectations. As the business continuously changes, so must the network that supports it.

Use the right metrics to measure reengineering success. The network should be measured in terms of value to the organization, rather than response times and cents per minute.

## Conclusions

Just as business organizations must always adapt in response to changing environments — due to competition, government regulation and other environmental factors — so must the network. A static network can impede, if not prohibit, a business' success. Just as a business strives for continuous process improvement, so must its network. Thus, the cycle of network reengineering never ends. The responsibility of the network reengineer is to constantly map the network to the business requirements of the day.

There is imminent temptation to focus network reengineering as the solution of the day, rather than considering the implications of that solution on the network's future resiliency. The truly successful Network IS professional adds to the network's flexibility in meeting future business requirements while solving today's problems.

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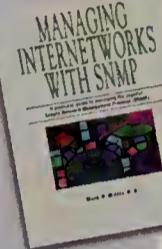
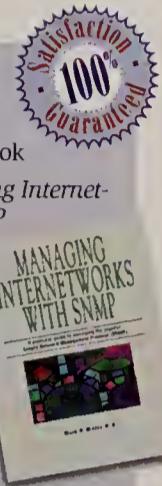
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## BRIEFS

Continued from page 45

offerings, and sell Lotus Notes companion products, such as gateways.

Separately, **Fujitsu Networks Industry, Inc.** in Stamford, Conn., has joined the Lotus Professional Developers' Program to tightly integrate its DeskTop Conferencing product with Lotus Notes.

**Verimation, Inc.**, based in Rockleigh, N.J., has announced the porting of its Memo electronic mail software to the IBM Application System/400 platform.

Memo already runs on local-area networks and mainframes, and those software packages can communicate with the new minicomputer version using Systems Network Architecture Distribution Services. The software, which is available now, costs between \$1,500 and \$35,000, depending on configuration.

Verimation: (201) 767-4795.

The **North American Directory Forum (NADF)** has opened its X.500 directory services pilot to the user community. AT&T, Advantis, GE Information Services and MCI Communications Corp. are among the vendors involved in the demo.

NADF: (202) 342-2727.

Several consulting firms specializing in client/server applications last week announced they have banded together to form a national alliance dubbed **The RightSource Group**.

The companies involved in the alliance will work together to serve users' regional and national needs. Charter members are InterAccess Corp. of Totowa, N.J., SQL Designs, Inc. of Lakeland, Fla., and Terrace Systems Corp. of San Francisco.

The RightSource Group: (800) 977-0300.

**Sun Microsystems Computer Corp.**, based in Mountain View, Calif., and **The Dodge Group**, based in Waltham, Mass., have signed an agreement under which both companies will codevelop and comarket a suite of client/server financial applications.

The products, based on The Dodge Group's Open Series accounting software, will operate on Sun SPARCservers running the Solaris operating system. Neither pricing nor availability have not been announced.

The Dodge Group: (617) 487-0022.

**Lotus Development Corp.** last week announced Release 2.0 of its Vendor Independent Messaging (VIM) Developer's Toolkit, an offering designed to help developers build mail-enabled applications for Lotus Notes running on Windows and OS/2, as well as cc:Mail running on DOS systems.

The previous version of the tool kit supported only cc:Mail on Windows and OS/2.

The developers' tool kit is available now at no charge through the Lotus Professional Developers' Program.

Lotus: (800) 338-7357.

# MDI intros enhancements to Oracle, SQL/400 gateways

BY PETER LISKE

Boulder, Colo.

Micro Decisionware, Inc. (MDI) has confirmed that the IBM AIX version of its Database Gateway for Oracle and Database Gateway for SQL/400 with Distributed Relational Database Architecture (DRDA) have entered beta testing and will be available next month.

The Database Gateway for Oracle will allow users of Microsoft Corp. Open Database Connectivity (ODBC) and Sybase, Inc. DB-Library applications to access Oracle Corp. databases as well as a variety of other databases from alternative vendors. The Database Gateway is designed to address the enterprise information requirements of Oracle users and pro-

vides ODBC and DB-Library client applications open and transparent access to Oracle LAN relational database management systems. Pricing for the product starts at \$10,000.

Also in beta is MDI's Database Gateway for SQL/400 with DRDA. Running on the OS/2 platform, the product provides Application System/400 users access from a broad range of development, query and spreadsheet applications written to the industry-standard DB-Library and ODBC application program interfaces. Pricing for the Database Gateway for SQL/400 starts at \$18,500.

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# Editorial

Maybe it's just me, but network operating system (NOS) vendors are pulling off a major sham on users right now.

NOS vendors are carefully positioning themselves as providers of enterprise-level local-area network services. With NetWare 4.0, Novell, Inc. has staked out the high ground, suggesting it can provide network services to pull together LAN users across the enterprise. Likewise, Banyan Systems, Inc., with its Enterprise Network Services, is reaching out to link disparate LAN environments to form an integrated environment.

But what these vendors and others aren't telling users is that their vision of the enterprise is one-dimensional — and limited largely to their own proprietary LAN environments. Few, if any, NOS vendors today can claim to offer the level of NOS interoperability users need to extend net services across the disparate LAN environments in an enterprise.

This week's feature on page 75, "NOS interoperability falls short," finds that most vendors are focusing on providing network services that play across the enterprise within their own native environments. And that, to a large extent, sounds an awful lot like the strategy IBM and other host-centric vendors foisted on users in the 1970s and 1980s.

True, companies like Banyan are beginning to address server interoperability, but users are paying an expensive premium in the form of a special piece of proprietary code loaded onto all servers in the net. Banyan should be applauded for bridging the NOS interoperability gap at the server and taking the issue to the next level.

Of the NOS bunch, however, perhaps IBM is positioned best for the long term. Like competitors, IBM currently provides shallow interoperability at the client level. But the vendor has embraced the Open Software Foundation, Inc.'s Distributed Computing Environment (DCE) to provide a standard level of directory and security services as well as other enterprise network services. With this level of support, NOS users can achieve interoperability with other NOS environments that support the DCE — without the caveat of adding extra proprietary code.

It's strange that IBM should lead vendors to a higher level of NOS interoperability. But even if IBM's plan has some drawbacks, it seems like a step that will truly enable net managers to provide LAN services on an enterprise scope, regardless of the underlying NOSes. Let me know what you think.

♦ CHARLES BRUNO

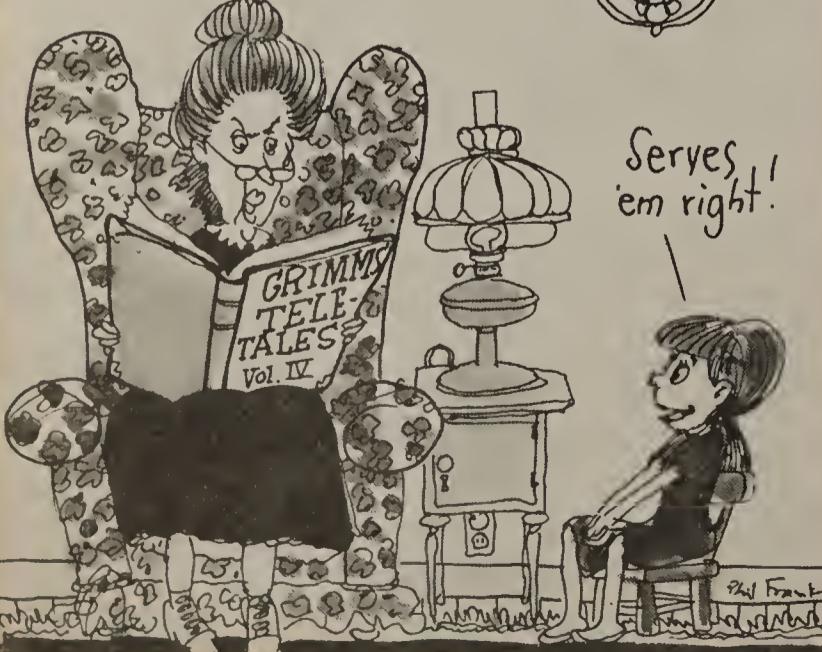
## Teletoons

FRANK AND TROISE

But the evil witch monitored their unencrypted data transmissions and uncovered the spell for turning dwarves into mice.



Serves 'em right!



## PUBLIC NETWORKING

By Mary Johnston Turner

# Multimedia, ATM demand fixed-priced carrier services

Users should continue to pressure carriers to provide electronic messaging services at a fixed price rather than a character-oriented, usage-based fee (NW, July 5, page 1). They would also be wise to carry the torch on this issue even further and push their carriers to re-examine price models for all types of data services.

Affordability of public services will make or break many new technologies already being readied for implementation. Users that see current charges for large messages escalating rapidly are right to fear that they will never be able to implement multimedia and Asynchronous Transfer Mode (ATM) unless pricing structures become much more predictable.

Carriers historically have been loath to offer users fixed-priced services for anything but private lines. Private lines provide 100% dedicated bandwidth that is available whenever the user desires.

With a private line, users are charged a fixed rate for the amount of bandwidth available on the circuit, instead of paying for the actual number of bits sent across that circuit. Many private lines are underutilized most of the time. They are put in place to handle peak-hour traffic, an expensive network design approach that will be virtually unaffordable for most users in a broadband world.

Carriers like usage pricing because it produces ever-increasing revenue and places the cost predictability risk on the user. This has resulted in a user bias toward private lines and private corporate networks, even in situations when a shared bandwidth service such as switched 56 or public packet services might make more sense from an average utilization point of view.

In a multimedia environment, private networks and private lines will have a much harder time keeping up with the demands of highly bursty multimedia application traffic because they cannot expand dynamically or flexibly. Private line-based solutions for this era will require almost endless capacity analysis and network redesign to keep application performance up-to-snuff. Continued reliance on fully dedicated, fixed-priced private lines will be too costly for all but a few of the largest users, such as some departments of the federal government.

The flexibility and real-time adjustability of public ATM services to support multimedia and advanced data applications is one of the major attractions driving users to examine these new service options. How ATM and related multimedia transport services are priced will determine whether they succeed.

Carriers that are truly interested in selling large quantities of advanced ATM and multimedia services will have to create new, predictable pricing structures. Users expect ATM services to offer a committed information rate that guarantees a specific amount of bandwidth will be available when needed for a fixed cost, with some ability to add extra bandwidth on demand

for short periods without incurring additional charges. These short high-capacity periods should accommodate the unpredictable high-speed bursts of data associated with client/server and distributed applications. Users recognize that just as there are times when they will need more bandwidth than usual, there also will be times when they need less.

The benefit of going to the public network is that a carrier's excess bandwidth can be shared by many users, making the actual cost of using the bandwidth more affordable to each user than it would be in a fully private, dedicated architecture.

Unfortunately, predictable pricing is unpopular with the carriers because they risk making less money than they might under a private-line type approach. In fact, most carriers fear that attractive pricing for new services will result in the quick erosion of existing profitable services, including private lines. They correctly reason that fairly priced, shared bandwidth is likely to be more attractive than flat-rate, dedicated bandwidth.

The carriers fear users will migrate from private lines to less expensive shared bandwidth, causing overall revenue to fall because the same number of users will be getting the same amount of bandwidth but at lower cost. What the carrier misses, of course, is that attractive pricing of new services could result in more overall usage and higher profits in the long term.

Users should require price predictability for the next generation of services and should not be asked to shoulder unpredictable bills as a penalty of adopting a new service. As technology allows multiple users to share carrier bandwidth, users and carriers should share the financial benefits.

Carriers should be expected to help their customers understand both current and future bandwidth requirements and offer pricing plans that are attractive to the customer while still profitable for the carrier. Unrealistic frame relay pricing and the difficulty many users have in getting access to any type of frame relay pricing information are major reasons why frame relay acceptance has been so slow.

Unless users insist that carriers adopt pricing changes, carriers are likely to continue the pattern of offering new services using old pricing paradigms and will be surprised when users don't race to embrace the new offerings.

Users planning to roll out distributed client/server and multimedia applications in the next few years cannot afford to give carriers several years to get the pricing right. Speak up now while the next-generation pricing models are being developed; the long-term payback in service affordability may be substantial.

♦ Turner is a principal at Northeast Consulting Resources, Inc., a Boston-based consulting company working with leading-edge users and vendors of information technology. She can be reached at (617) 570-0790 or via MCI Mail at 384-0973.

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## USER FORUM

By Mark Brooks

# Aid users in organizing change

New 32-bit operating systems, such as IBM's OS/2 2.1 and LAN Server, Microsoft Corp.'s Windows NT and Advanced Server, Novell, Inc.'s NetWare 4.0 and Univel's UnixWare, are increasingly being considered for complex, enterprise-wide applications. Marketers of these products, however, continue to focus sales presentations on features and enhancements when managerial and organizational change issues are becoming more critical to the success of the user's product implementations.

Sure, directory services, symmetrical multiprocessing, multi-threading and application portability are important technical selling points these days. But how about a few assessments of the organizational impact of switching the company from Systems Network Architecture to Transmission Control Protocol/Internet Protocol, or recommendations for restructuring internal support as a result of adopting Unix or an object-oriented graphical user interface?

Understanding the organizational effects and dynamics of change can be critical to the customer's ultimate success and acceptance of new technologies, especially in enterprise-level systems that have the potential to affect the entire corporation.

Let's use a hypothetical NetWare 4.0 and NetWare Directory Services (NDS) implementation to illustrate the political realities customers now must consider.

Take a large, decentralized corporation with numerous departmental NetWare file servers and at least one mainframe, not necessarily managed by the same division.

A companywide adoption of NetWare 4.0 and NDS will affect many of the corporation's information systems (IS) and non-IS employees, who, depending on their particular situation, may either want to participate in or complicate the new system's implementation.

Those affected could include departmental local-area network administrators, especially those who assumed their role after the departure of the LAN's original implementor. These people



have learned NetWare the hard way — through numerous late nights at the office, borrowed certified NetWare engineer study guides and visits to the computer section of the local bookstore. Now as seasoned LAN veterans, they're beginning to enjoy their superiors' respect and the department's awe of their abilities.

The Novell and reseller representatives recommending NetWare 4.0 and NDS should help the user anticipate departmental administrators' concerns about their postimplementation management and support responsibilities, and offer realistic, up-front advice for how to address these issues. If these and other organizational questions are not addressed before the purchase and implementation decision, departmental administrators could view the centralized management features of NetWare 4.0 as a diminishment of their role as LAN administrator, instead of as a benefit for corporate-wide LAN application access.

Mainframe IS managers also stand to be affected. These managers can no longer ignore the fact that NetWare 4.0 has the potential to support some or all of the corporation's mission-critical applications, setting the stage for a possible long-term erosion of the manager's power base that has been carefully cultivated over the years.

If enterprise-wide products such as NetWare 4.0 and NDS are not consciously positioned with respect to mainframe services, IS managers may view the change as a threat to their jobs, especially given the LAN staff's "PC-centric" view of the world. Mainframe IS managers' resentment could also be fueled by the commonly held opinion that LAN staff doesn't understand the mainframe and its advantages or even appreciate the hundreds of man-years that have been invested in developing applications that have become essential to the corporation's success.

Lastly, end users could be affected. They often feel they're continually being asked to change the way they work in order to accommodate the next technology standard — often before they've mastered the technology already in place. Since end

users may not grasp the complexity and breadth of change associated with an enterprise-wide implementation, publicly voiced criticism and misinformation originating from disgruntled department LAN administrators and mainframe IS managers could make them very uncomfortable.

Marketers of new 32-bit operating system and network operating system (NOS) software should play a strong role in helping customers deal with these and other managerial and organizational change issues resulting from a purchase of their products.

To do this, vendors must develop a genuine understanding of the users' business and the industries in which they compete, as well as a general knowledge of the business functions performed by the departments that will initially be affected by the product implementation.

Then they need to help customers focus on the nontechnical implementation issues, encouraging customers to actively communicate and reemphasize their goal to all employees when making the change. Recommendations such as incorporating representatives of potentially affected groups early in the decision-making process and listening to their concerns as they arise could also be helpful.

Vendors can also develop stock articles and newsletter templates that customers can use in an internal public relations campaign for the new system; providing posters or videotapes that tell of the benefits of the new system, as well as some of the organizational changes that may be required in order to take advantage of the system; and passing on case studies of implementation successes and failures.

The above suggestions aside, just an up-front discussion of the organizational impact associated with the broad-scale adoption of 32-bit operating system and NOS technologies will go a long way toward painting a more accurate picture of what users should expect from the purchase and use of these products.

♦ Brooks is president of NetWare Users International's North American Region and works for a large financial services organization in New York. The views expressed are his own. He can be reached via Internet at 75600, 1136@compuserve.com.

## NETWORK WORLD

Editor  
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Jim Duffy - Senior Editor  
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### LOCAL NETWORKS

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# Letters



lack the CNE certificate doesn't mean that I can't perform as well as or better than a CNE.

I work for a company that employs no more than 15 people, and rightly, the company can't afford to send me to a CNE certification school. In today's job market, what can I do without CNE status? I design, sell and install Novell, Inc. local-area networks. I know my stuff, but employers are looking for those three letters "CNE" and I just can't afford it.

I don't care whether this is published or not; I just hope to stir some commotion and get Novell to get

down-to-earth. I just wonder why I keep selling Novell operating systems and keep helping Novell. Novell hasn't helped me.

Chris Wertz  
Computer services manager  
Coates, McCullar & Biggers, P.C.  
(Certified public accountants and  
consultants)  
Eufaula, Ala.

## Who needs a CNE?

I enjoyed reading Douglas Welch's column. He made a lot of good points, but I can't agree with

his conclusion. I doubt that Novell, Inc. is making much money with its training program, either financially or in the quality of the product it produces, CNEs. I think Mr. Welch is underestimating the educational marketplace and our schools, which aren't using, nor do they need to use, any vendor-specific network curriculum.

Creating a training curriculum, staffing, providing facilities, filling a classroom and ensuring some level of quality control all costs money. Someone has to pay for it and that someone is the consumer, the con-

See Letters, page 92

## CNE's harsh reality

Douglas Welch brought home the harshness of reality in his User Forum column about Certified NetWare Engineer (CNE) training (Aug. 2, page 33). The fact is that jobs are being offered to those who have the CNE certification, but just because I

A large, dark pyramid with a bright light source at its apex, casting a long shadow on the ground.

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*Our Networks Mean Business*

# NOS interoperability

fells short

BY CARYN GILLOOLY



ife used to be much simpler.

Most folks didn't have to watch their cholesterol levels, residents in the Midwest actually looked forward to rain, and nobody had to worry about interconnecting different brands of local-area network operating systems.

Just a decade ago, autonomous business units launched a grass roots revolution to install LANs. Departments wanted LANs to run their own applications. Employees were breaking their tether from the corporate mainframe and, consequently, had no need to consider providing connections to other departments.

But, as the saying goes, hindsight is 20/20. Today, while LANs still rule the roost, corporations are coming full circle to the concept of providing centralized networking services — which means LAN connectivity across the enterprise is a necessity.

"Getting our different LAN operating systems talking is becoming more of a requirement," says George Sparks, manager of technology and planning at Baxter Healthcare Corp. in Deerfield, Ill.

Unfortunately, that's the one area in which most network operating system (NOS) vendors have repeatedly slacked off.

"Most companies out there have about one of everything," says Tom Nolle, president of CIMI Corp., a consulting firm based in Voorhees, N.J. "About 20% to 30% of major organizations and about 50% of midsize organizations have some problem with multiple network operating systems. Almost everyone I talk with says it's a problem."

While users grapple with the NOS interoperability gap, vendors have spread the word about their desire to provide enterprise-wide network services for corporate users.

However, even as they unfold plans for corporate network services, interoperability with other LANs across the enterprise is downplayed.

"It depends who's defining the concept of enterprise services," says Bob Janusaitis, a technical manager with Business Systems Group (BSG), a Houston consultancy. Enterprise services from one vendor may "mean enterprise-wide service within a vendor's environment,

but it doesn't necessarily mean connectivity to all the NOSes in the enterprise," he says.

Some NOS vendors are making a concerted effort to link various brands of NOSes. Banyan Systems, Inc., for example, by the end of the year will let users on Novell, Inc. NetWare and its own VINES nets retrieve files resident on one another's servers through its Enterprise Network Services (ENS) for NetWare product.

Other vendors, however, are focusing

NOS gap. Application development platforms such as Microsoft Corp.'s Windows Open Services Architecture (WOSA) and Novell's AppWare are designed to let developers build applications that access data across an enterprise, regardless of what environment the code runs in.

But analysts and users agree that, for now, few users will opt for application-based interoperability because the concept is largely untested. Therefore, the majority of users with multiple LAN

between NOSes by bringing other NOS resources under the VINES umbrella. Announced first for the NetWare environment, ENS for NetWare is touted as a NetWare add-on, giving NetWare users access to all VINES services, including Banyan's StreetTalk directory service.

But, according to Barry Burke, director and product-line manager of enterprise applications at Banyan, based in Westborough, Mass., NetWare is only the first envi-

*Except for  
Banyan's ENS,  
vendors focus  
on client  
interoperability,  
which strains  
end users.*



on providing interoperability through client workstations instead of at the server level. For example, both Novell and IBM require users on their respective NetWare and LAN Server nets to run multiple NOS shells on their client machines to access resources on other LANs.

But vendors have come under attack by users and analysts, who say client-based interoperability is a short-term solution that burdens end users with having to learn multiple NOS environments. Another shortcoming of client interoperability is that users have to know which NOS a resource resides on in order to access it. Server-based interoperability is preferred because it gives users access to multiple brands of servers from within their native NOS environments.

Another alternative just now emerging is to look to applications to bridge the

environments are still looking for ways to make them work together.

And that's where it pays to examine the different vendor approaches.

## BANYAN'S MISSION

Novell is the leading NOS vendor, and its market share percentages are growing. In 1991, NetWare represented 63% of the 7.8 million LAN nodes shipped, while that number grew to 66% of 11.4 million nodes shipped last year, according to International Data Corp., a Framingham, Mass., market research firm.

That puts quite an onus on other NOS vendors to enable their products to fit into NetWare environments. And that is exactly what Banyan is doing with VINES.

Announced last September, ENS is Banyan's answer to bridging the gap

between NOSes supported under the company's ENS plan.

"We intend to bring ENS solutions to other environments," he says. "LAN Server and LAN Manager are the other obvious ones." Burke would not provide further details on directions that Banyan might be taking with ENS.

When support for these other NOSes are added, however, VINES users would have complete access to all services provided through LAN Manager and LAN Server.

Banyan is the sole NOS vendor providing interoperability to other NOSes through the server rather than the client. And although the other vendors certainly won't admit it, the server approach offers inherent advantages.

"That level of interoperability [at the client] is relatively shallow and pretty easy to achieve," says Robert Martin, Banyan's director of product marketing. "The step we take beyond that is to integrate network services with the functionality other vendors are providing." He adds that the goal is to "make the net services functionality acceptable from the simplest possible fashion."

Interoperability at the NOS server is *Continued on page 76*

Continued from page 75

by far the easiest approach for end users. With protocols supported on the servers rather than on clients, users do nothing different; they simply log on to the network as usual, and access to other nets is provided transparently, without having to log on to a different server and without knowing that resources are on a different server.

From Banyan's perspective, because the company already offers a directory service and other related services, it is not difficult for the company to provide a single logon — even for other environments — and transparent access to all network services.

Anne Ward Williams, senior systems engineer for ies/Basicomputer, Inc., a LAN integration and consulting company in Akron, Ohio,

has been working with one client that tested a beta copy of ENS for NetWare and is currently planning to implement it throughout the organization.

Williams described how the company tied its NetWare and Banyan LANs together before they began testing ENS.

"Before we had to use [Open Data-Link Interface] and [Microsoft's Network Driver Interface Specification] drivers and load both [NOS] protocol stacks at each client workstation," she says, referring to Novell's ODI and the industry-standard NDIS drivers as well as the NOS redirectors. "That was not an easy setup because it was basically customized at each workstation."

Williams also pointed out that with both the ODI and NDIS drivers, while the company could write a logon script to let users onto both types of servers simultaneously, users still had to know the ins and outs of each environment. And often, users had to know which network to go to in order to find the necessary resources since integrated directory services did not exist.

With the access to Banyan's StreetTalk provided through ENS for NetWare, users log on to the network once and have access to two different environments transparently.

The access and integration of other environments with StreetTalk is also the foundation for one of ENS for NetWare's strongest selling points — NetWare integration. Currently, there is no way to synchronize all of Novell's NetWare 2.X, 3.X and 4.X versions, not even using Novell's NetWare Directory Service provided through NetWare 4.01.

Through ENS for NetWare, all NetWare and

VINES directories can be automatically synchronized and updated throughout the enterprise.

"If you add something on either side, it's automatically updated on both," Williams says.

But ENS for NetWare doesn't stop at directory synchronization. The product also provides NetWare users full access to all VINES services, such as the company's Intelligent Messaging, network management and security capabilities. And with the next release, not only will NetWare users be able to access VINES files, printers and services, VINES users will be provided the same access to similar services in NetWare environments.

#### MICROSOFT'S CLIENT FOCUS

Microsoft, too, is taking steps to provide interoperability with NetWare services, but focusing primarily on the client side rather than the server side.

John Donaldson, supervisor for LAN services at the University of California (UCAL) at San Francisco supports about 100 NetWare and 50 LAN Manager servers, in addition to 50 IBM LAN Server and 300 Apple Computer, Inc. AppleTalk servers.

"I'm not biased toward LAN Manager, but in terms of multiple access and multiple connectivity between different NOSes, LAN Manager is the best," Donaldson says.

He notes that in every LAN Manager box, Microsoft includes LAN Manager/NetWare Connectivity, which basically consists of a Novell Internetwork Packet Exchange (IPX) protocol stack that the administrator loads on every LAN Manager workstation.

## The ins and outs of ENS

**Banyan Systems, Inc.'s Enterprise Network Services (ENS) is unlike any other network operating system (NOS) integration product available today — it provides file, print and net services integration with, potentially, all other major NOSes.**

**ENS for NetWare is a three-part product consisting of VINES core protocols without the file and print capabilities; a NetWare Loadable Module (NLM) or value-added process (VAP) to reside on the NetWare server; and a terminate-and-stay-resident (TSR) program for NetWare clients.**

**The workstation TSR will direct calls made to the NetWare Bindery to the NLM or VAP within the NetWare servers. From there, the NLM or VAP will direct NetWare calls to the Bindery and VINES calls to the attached VINES-based Unix server.**

**Each VINES server can support as many as eight NetWare servers, and each TSR takes up less than 30K bytes of workstation memory. Wide-area communications are provided to NetWare users by encapsulating Novell, Inc.'s Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX) protocols into Banyan routing protocols.**

**Together, the components will give NetWare users access to all VINES services — such as electronic mail, security, directory and net management — and will let them log on to the net once to access a variety of net services. NetWare users must now log on to each server they need to access.**

**Available since December, ENS for NetWare costs \$3,995.**

**BY CARYN GILLOOLY**

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"That workstation can then maintain multiple logins to multiple servers," Donaldson says. "And there's no loss in functionality — the workstation behaves the same."

Once users have logged on to both servers, they can access all files and services provided through the LAN Manager server and can access files resident on the NetWare server. But users still have to know how to log on to the NetWare server and must know NetWare commands to navigate the network. The kicker is that users can only access NetWare files, not services.

But perhaps most importantly, users still are logged on to two servers — there is no server synchronization and no way to connect the two.

LAN Manager provides more than just NetWare connectivity right out of the box, however. It also provides server-based connectivity to AppleTalk nets as well as Unix connections through the Transmission Control Protocol/Internet Protocol.

With server-based protocol support, clients within each of these environments can access LAN Manager services as if they were resident on their local net.

In addition, because IBM's LAN Server evolved from LAN Manager, clients within each environment are able to transparently access services within the other environment.

"LAN Server and LAN Manager are kissing cousins," Donaldson says. With each new version, the two diverge more and more, although both servers are still available to clients on each type of network because they're both Network Basic I/O System-based, he adds.

Much of this equation will change, how-

ever, with the impending release of Microsoft's much-touted Windows NT and Windows NT Advanced Server. According to Donaldson, the LAN Manager capabilities expected to be incorporated into NT Advanced Server and LAN Manager will fade away, although Microsoft executives would not confirm this.

But Advanced Server, he adds, is expected to provide the same general connectivity capabilities as LAN Manager in terms of NOS integration. Advanced Server will come bundled with the LAN Manager/NetWare Connectivity feature, just as LAN Manager does, and will also provide the same server-based AppleTalk and TCP/IP connectivity.

These abilities, however, will not be inherent in NT itself. Therefore, if users are looking to implement an NT-based network, Windows NT Advanced Server is the choice if NOS interoperability is at stake.

#### IBM BETS ON DCE

As with Microsoft's LAN Manager, IBM provides server-level connectivity for Macintosh clients, letting those clients access LAN Server services as if they were Macintosh services. However, beyond Macintosh support, IBM is relying solely on the dual-redirector method of NOS interoperability without providing some of the out-of-the-box hooks that Microsoft does.

"The first form of interoperability we offer is client interoperability," says Art Olbert, president of IBM's Personal Software Products division in Austin, Texas. "We'll support a DOS, Windows or OS/2 client accessing NetWare, LAN Server and LAN Manager."

As with LAN Manager/NetWare dual redi-

rectors, LAN Server/NetWare dual redirectors will provide file access but will not provide access to the NOS-based services such as security, network management or directory services if they are available. And, once again, the user has to log on to and get around in two environments.

Also similar to LAN Manager's changing fate, the LAN Server equation will soon be changing, as well. By the beginning of next year, IBM intends to bring out a new version of LAN Server that will provide the same directory service-based connectivity to NetWare as Banyan provides but will do so through the implementation of the Open Software Foundation, Inc.'s Distributed Computing Environment (DCE).

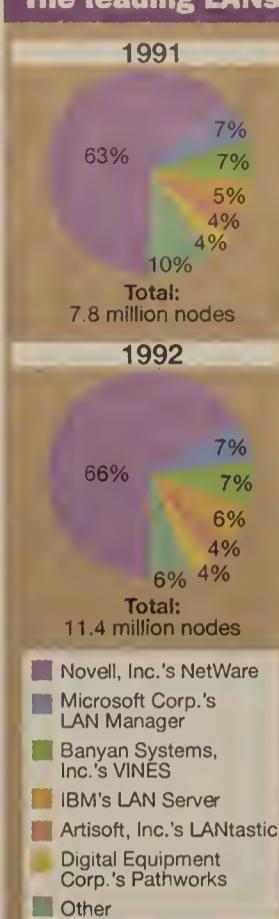
According to Olbert, LAN Server 4.0 will include the directory, security and remote procedure call services specified by the DCE. With the DCE directory, in particular, LAN Server will be able to link to any other NOS that can interoperate with the DCE directory, such as NetWare.

This will provide similar capabilities to those currently afforded between NetWare and VINES users. "LAN Server 4.0 will be able to interoperate with NetWare 2, 3 and 4 through DCE," Olbert said. "Novell and our customers will get server-to-server interoperability. With the directories together, the user will only have to log on once."

#### SEEING RED

Perhaps because Novell has such a dominant share of the market, users agree that the company is the worst at providing connectivity to other vendors' NOSes. Instead of making

#### The leading LANs



Figures reflect worldwide PC LAN operating system market share based on the percentage of nodes shipped.

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

the effort to provide that connectivity itself, Novell sits back and waits for other vendors to connect to NetWare.

And Novell makes no bones about it. "The way Banyan implemented ENS is via [NetWare Loadable Modules]," says Bob Young, director of NetWare products marketing for Novell's NetWare Systems Group in Provo, Utah. "The architecture of NetWare 3.X and 4. allows integration with other environments through NLMs."

By this, Young means that the Novell architecture is open — any other vendor can write an NLM to fit into the NetWare environment and provide any connectivity or other service necessary.

Novell, like other vendors, does provide Macintosh and TCP/IP connectivity on the server. And, to its credit, although it relies on other vendors to provide

Continued on page 79

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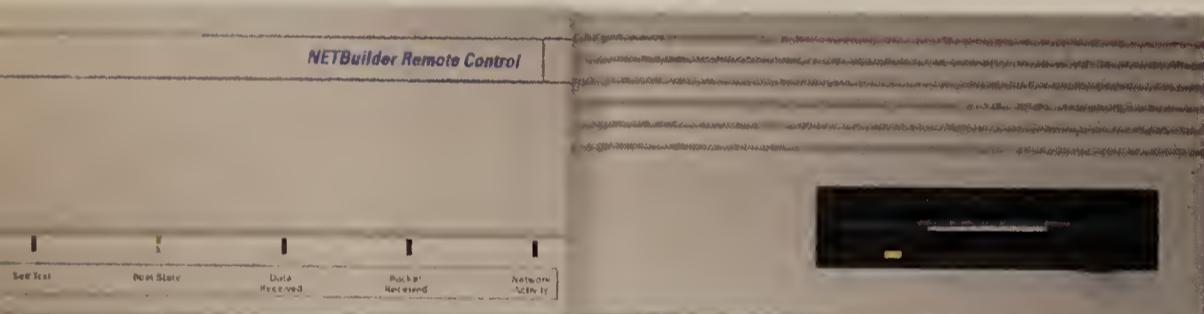
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Continued from page 77

server-based NetWare connectivity, Novell has tried to make that difficult connection a little easier.

About one year ago, Novell started its Network Technology Licensing program, which lets any vendor take any element of NetWare and use it in part of their system. This means that vendors may license Novell's NetWare Core Protocol (NCP) stack, include it in their own NOS server environment and provide transparent connectivity, as is provided for Macintosh clients.

Unfortunately, none of the primary NOS vendors have chosen to include NCP in their products. One reason is the difficulty, but also none seem to be sure that it's what their customers want.

"We've not implemented NCP. We've been focusing on dual redirectors," says Banyan's Burke. "If it were as inexpensive and efficient as supporting Macs, we would do it. But while NCP is available now, it's very expensive. And it's only available for NetWare 3.11. It's just not clear NCP is the right path to take."

Still, Novell is pushing the concept of enterprise services with NetWare 4.0. And although the product may have a degree of NetWare-centricity now, Kevin Auger, Novell's product-line manager for NetWare operating systems, says the vendor is following a phased approach to NOS interoperability. So far, the company has interoperability at the client level, and it is working to broaden that to servers.

"We don't think [server interoperability] exists anywhere today," Auger says. Novell, he says, has been working with a number of LAN vendors to address NOS server interoperability, although he stopped short of providing further details.

"Some vendors have fully adopted the DCE as a strategy," Auger says. "We could do that too, but we want to take a broader approach. We don't think everyone will adopt the DCE." Should vendors and users fully embrace it, Auger says Novell, "will be there as well."

#### A DIFFERENT PERSPECTIVE

Some analysts suggested that for users with multiple NOSes, the problem is not to try to integrate them, but rather to try to standardize on just one.

"The problem of integrating two NOSes in any cohesive way is a losing proposition in the long term," says CIMI's Nolle. "It's like trying to hand a laptop back and forth between two moving trains. It just won't work."

"Any company that has multiple NOSes that need to talk should seriously consider consolidating to a single environment," he adds.

This alternative, however desirable, is simply not feasible for many users. "When I first came on board here, we thought we'd move all the systems to one product," says UCAL's Donaldson. "But the campus demanded we handle multiple NOSes and protocols."

Baxter Healthcare's Sparks oversees about 200 LANs, in addition to IBM mainframes and terminals, Application System/400s and Digital Equipment Corp. VAXes spread over several cities.

An alternative to both network consolidation and NOS interoperability is to begin building the company's mission-critical applications on NOS- and operating system-independent platforms such as Microsoft's WOSA and Novell's AppWare.

"To harmonize your environment, you have to develop applications that have to be supported on multiple NOSes, on nonspecific platforms," Nolle explains.

Using the WOSA or AppWare application development interface specifications, an application can be developed to reside on any operating system and access services on any NOS. This means that even if a company is forced to maintain multiple NOSes, users will still be able to access any service or application on the corporate net, regardless of the environment it's running in.

"Our goal [with WOSA] is to provide interoperability across different NOSes for a range of services," says Mike Fritz, group manager for the development relations group at Microsoft in Redmond, Wash. "WOSA is a frame-

work to enable different Windows applications to work with different back-end services."

Novell has similar goals with AppWare — providing multiple hooks into different NOSes so an application can get data from virtually anywhere within an enterprise. But at least for now, AppWare has more of a NetWare focus.

"Network applications are scarce and hard to build," says Willie Tejada, director of developer relations for Novell. "Our goal with AppWare is to hide the complexity of the network and increase development of applications" that can be accessed across a heterogeneous network.

According to BSG's Janusaitis, AppWare appears to be a step in the right direction, "but it remains to be seen just how seamless it's going to be."

He notes that there's a larger issue users and vendors need to face. As companies develop network applications based on object technology, they must consider the underlying security infrastructure to keep access to various network resources in sync.

"Over the last few years, companies have jeopardized the security aspects of databases for application functionality, and now these

Continued on page 87

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## CLIENT SERVER ISSUES

Another force behind the adoption of client/server is time-based performance, which is performance measured by an organization's time to market, its production cycle time and its response time for customer requests. The significance of time-based competition is rising across all industries, and it is enhancing and expediting data sharing among users.

Along with the cry for more effective data sharing is the reduction of the so-called "information float," a common problem within companies where information is deposited into a system but cannot be immediately withdrawn until other data processing events have taken place.

Once information is deposited in a system, it should be available to trigger events quickly anywhere across the corporate network. The client/server model is designed to provide quick and easy access to many information sources, and answers the need for fast response. Also, it can ultimately reduce the volume of information float.

### NOT DUMB ANYMORE

In today's markets, legacy applications on centralized mainframe computers provide systems that are monolithic and inflexible. Application development usually extends over long time frames, and costs can sometimes be astronomical compared to client/server systems. Processing power, in the form of million instructions per second, also tends to be more expensive.

The host-based processing model has provided access to information via legacy applications for the past 20 years. During this time, host-based application processing was performed on a mainframe supporting attached dumb terminals.

The mainframe-centric model uses the presentation capabilities of the dumb terminal to display screen buffers, which are formatted at the IBM host. In a traditional mainframe or mid-range computer environment, access to information, in many instances, requires extensive programming.

Organizations today want to take advantage of the low-cost and user-

# Separating client/server fact from fiction

CONTINUED FROM PAGE 1

friendly environment that exists with desktop workstations. There is also a strong requirement to capitalize on existing investments at the desktop and in the portfolio of business applications currently running on the mainframe host. Thus, many corporate networks are typically put in place to connect user workstations to the host.

Client/server computing provides the capability for employing the most cost-effective user interface, data storage, connectivity and application services. The client/server model provides the technological means to salvage existing investments while taking advantage of current technology options.

The benefits of client/server are many. There's flexibility to extend and tailor a networked application to meet changing business requirements; scalability, to size applications; rapid applications development, improved data quality and possible reduced computing costs, to name just a few.

### CLIENT/SERVER MODEL

In its most basic form, the client/server model implies a cooperative processing of requests submitted by a client — or requester — to the server, which processes the requests and returns the results to the client. Client/server processing is a special form of distributed computing where resources are spread across two or more discrete computing systems.

The client/server model has four interacting components: applications processing, which is typically split between two or more hardware platforms; database management systems may also be deployed; hardware components typically consisting of mid-range computers, file servers and workstations; and network gear, which typically consists of cabling, routers, concentrators and protocols.

The client/server processing model has emerged as a higher level of shared access and processing, which is typically found on local-area networks. However, there is a spectrum of outstanding technical issues that make the implementation of client/server applications a formidable task. For instance, many companies underestimate the impact of transaction loads across the network. Additionally, the lack of adequate performance measurement tools to fine-tune applications makes it nearly impossible to get optimal performance from client/server nets today.

Given the difficulties of implementation, there are still substantive benefits to adopting a client/server architecture. Corporations can leverage emerging desktop computing technologies more

effectively. Today's workstations deliver considerable computing power — previously only available from mainframes — at a fraction of the cost. In addition, processing can reside close to the source of the data being accessed. Therefore, network traffic and response times can be reduced, and effective throughput increased.

Client/server architectures also take advantage of graphical user interfaces (GUI). These interfaces can be delivered to users in a variety of visual presentation techniques and provide easy navigation and consistency. As a result, new applications that exceed user expectations can be developed faster, and end-user resistance to accepting new applications can be minimized.

Properly implemented, client/server architectures can reduce software maintenance costs, increase software portability, boost the performance of existing networks and even eliminate application backlog by increasing developers' productivity and shortening the development life cycle.

### ROLE OF THE CLIENT

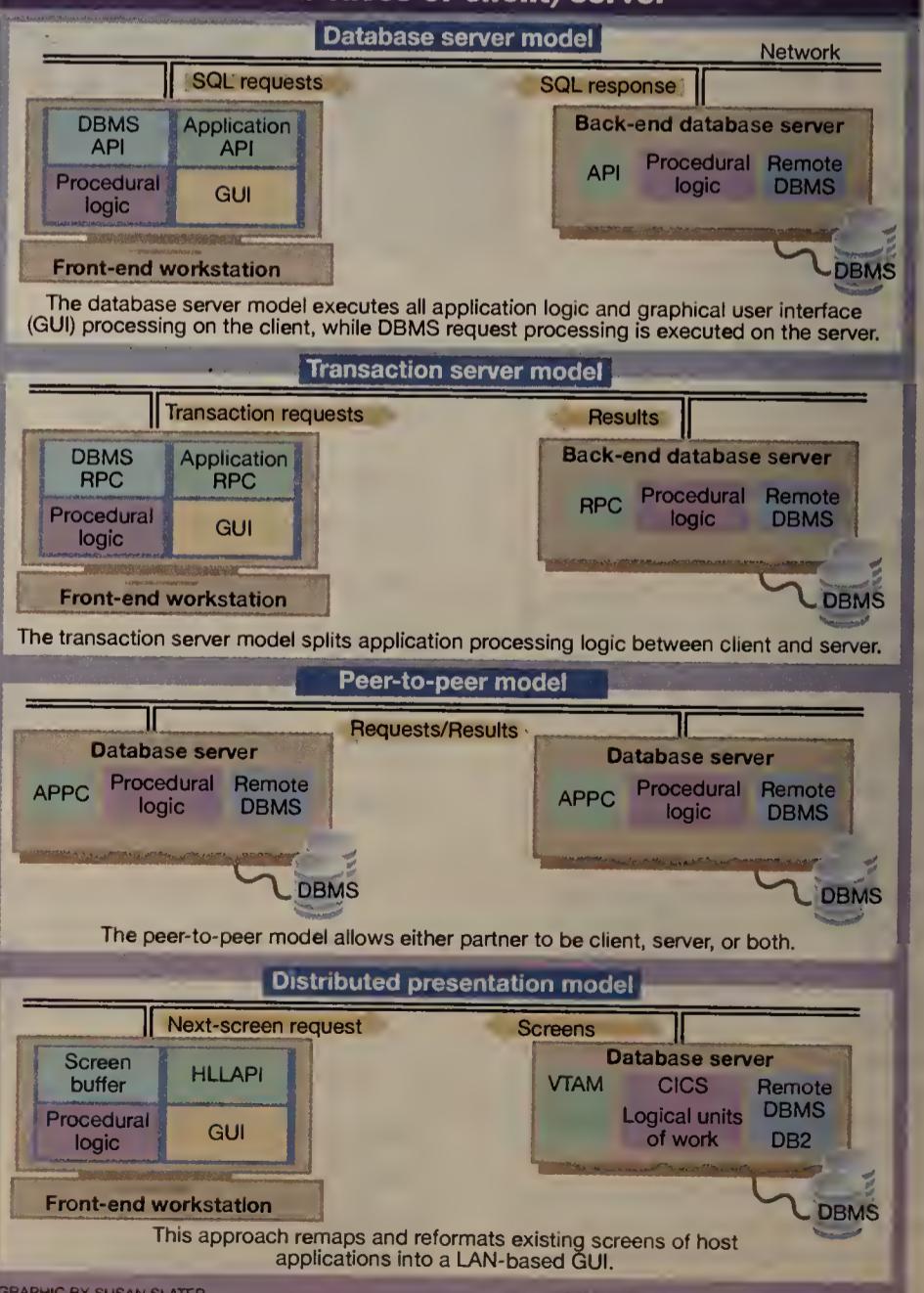
In the client/server architecture, the client is primarily a consumer of services provided by one or more servers. The architecture provides a clear separation of functions based on the idea of servers acting as service providers responding to requests from clients. The client usually provides presentation services, since workstations currently provide a cost-effective platform on which to perform data presentation.

Client workstations generally are responsible for a range of tasks including requests for services. Clients request services from the attached server, whether the server is on the same network or on a remote one. The requests for services are made using application program interfaces (API), which communicate with the server.

There are many services that the client may tap. For instance, clients may manage windows services that provide the ability to activate, view, move, size or hide a particular window. These services

Continued on page 84

### Four faces of client/server



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Continued from page 80

are essential in a client/server implementation because they interact with message services provided to notify the user of events that occur on the server. Applications using GUI software place data into the virtual screen, and the windowing service handles placement and manipulation of the application window. This vastly simplifies application development because there is no need for the developer to build or manage the windowing services.

Clients also communicate with servers through a set of network services that create, send, receive and format network messages.

These transport protocols support the transfer of client requests to the server and include Transmission Control Protocol/Internet Protocol, Internetwork Packet Exchange (IPX) and Network Basic I/O System.

Depending on the client/server processing model used, application processing services may be available on the client processor. This service loads the application code into client memory for execution. Requests are then issued for services or data.

At the server level, database servers often come into play to handle a client request. Database requests are usually made using SQL syn-

tax, which is an industry standard language supported by most DBMS vendors. The ANSI-compliant SQL uses a standard format, and the same application can run with different DBMSs. This provides for some level of portability.

#### ROLE OF THE SERVER

Servers typically provide services to requesting clients. In a client/server architecture, these services can be provided for an entire business function or a partial one, invoked through APIs or standard system calls. A collection of servers may work

together to provide an entire business function, such as divisional servers feeding summary accounting data up to a corporate level server that consolidates it and generates a report.

These servers may be running several network operating systems (NOS) across different hardware platforms and use different brand database servers. The client application invokes these services without considering the technology of the various servers.

In a client/server scenario, application servers provide request-processing services. Requests are issued by clients to the NOS shell, which is resident on the client device. These services format the request into an appropriate message format and issue the request to the application layer of the client protocol stack. This request is received by the application layer of the protocol stack on the server, where the request is processed.

Servers also provide file services that handle access to the virtual directories and files located on the server. The virtual drives can be used to store

data and programs. To minimize software installation and maintenance, most application software should be loaded from the server for execution on the client. New versions can be updated on the server and made available to clients immediately.

Relational client/server DBMS engines, such as Sybase, Inc.'s SQL Server, Oracle Corp.'s Oracle, Gupta Corp.'s SQLbase and Informix Software, Inc.'s Informix, provide support at the server to execute SQL requests issued from clients. The file services are still used for space allocation and basic directory services, but all other services are provided directly by the database server.

LAN/WAN connection services are provided through the NOS, as well as bridges, routers and gateways. Likewise, servers administer security; users are usually required to logon with a user identification and password. Also, access to DBMSs require that authority be granted before relational tables can be processed.

#### FOUR BASIC MODELS

In any client/server architecture, client and server systems are constructed from a number of interconnected components. Coordination and cooperation among components is provided by synchronizing functions running at the client and server. Commercial applications can be viewed as a set of component functions for data access, application logic and user interface.

There are four models for processing transactions in a client/server architecture, and selecting the correct processing option can be a daunting task, even for the most experienced systems designer.

Database servers represent the most common form of client/server processing, and the majority of implementations will probably fall into this category. This architecture positions all application logic and user interface functions executing on the client. Data access functions typically execute on the server, which is usually a relational DBMS.

The database server processes SQL requests only — all other functionality is executed on the client machine. Clients communi-

Continued on page 86

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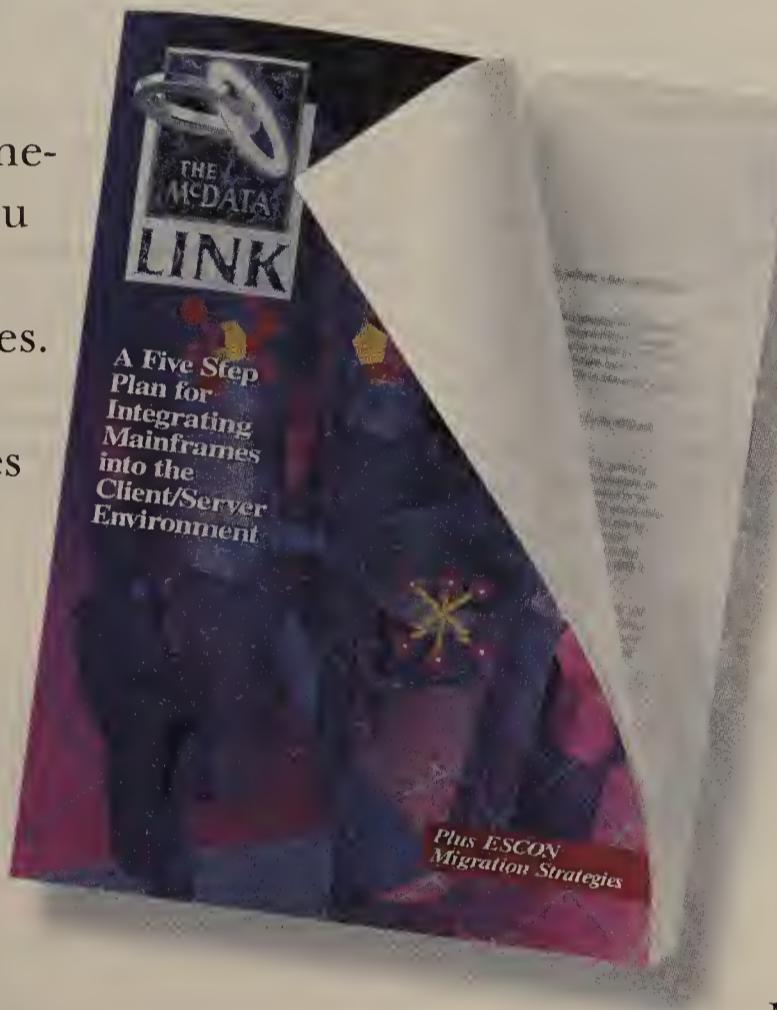
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Continued from page 84

cate with the server via an API, which formats and ships the SQL syntax to the server for processing. DBMS vendors supply the API in the form of an executable or dynamic link library module.

The database server can reside on various hardware platforms and support numerous operating systems. For example, Oracle's APIs allow users to communicate with OS/2, Unix-based, VAX VMS and IBM MVS server environments.

This model is well suited for building decision support, executive information systems, and small-scale data entry and retrieval. However, because of architectural limitations, problems such as slow response times may arise when users try to run production applications that have high transaction volumes.

One alternative to the database model is a

transaction server model, which divides application logic between clients and servers, with most of the application processing occurring on the server.

This model is transaction-driven using logical units of work, which are requested by the client and executed by the server. Transactions can be complex or simple in nature, or require processor-intensive data manipulation. This model permits messages to be sent to the server, which accomplishes both data access and manipulation, with only the result being sent back to the client.

The transaction processing model provides an effective way to balance the load between clients and servers, and reduce network traffic. Data-intensive processing requirements can be executed at the server, and user-intensive tasks such as data presentation can be performed by the client.

### LINES OF TRANSACTION

There are three predominant ways to build transaction server model applications: remote procedure calls, stored procedures and on-line transaction processing. Remote procedure calls (RPC) are a fundamental model for distributed computing. Novell, Inc.'s NetWare Core Protocol (NCP) and Sun Microsystems, Inc.'s Network File System were built based on this processing model.

An RPC system automates the production of code that connects the procedure call on one machine to the entry point of the procedure on another and connects the return of the procedure back to the caller.

The major DBMS vendors advocate another alternative using a technology known

as stored procedures. Stored procedures are collections of SQL statements and flow-control directives — such as IF, THEN and ELSE — that are parsed, verified, compiled, bound and stored at the DBMS server. Stored procedures can call other procedures and be executed on remote database servers. SQL statements can be static, which means they are parsed, verified, compiled, bound and stored in the DBMS server before they are executed. Or they may be dynamic.

With dynamic SQL, parsing, verifying, compiling and binding are performed with the execution of the SQL statements, although the resulting performance may be greatly decreased. Some database systems, such as DB2, implement static SQL so the SQL statements are parsed and compiled before execution, during the program preparation process. The resulting objects are stored in appropriate database libraries from where they can be recalled. Other database systems, such as Sybase's SQL Server, parse and compile SQL statements the first time they are executed and may store the results in memory or a shared procedure cache.

Transaction management technology has evolved to reflect computing trends in downsizing and client/server. Today, transaction processing technology is becoming increasingly important because of the need to perform on-line transaction processing on open distributed systems and in the client/server architecture.

IBM's CICS OS/2, Transarc Corp.'s Encina and AT&T's Tuxedo are powerful mechanisms to develop transaction processing applications. These transaction monitors provide a

robust set of transaction management facilities that can be deployed in a distributed fashion.

DBMS and transaction processing may be two of the more common architectures deployed for client/server networks, but users shouldn't underestimate the merits of the peer-to-peer model.

The peer model is similar to the transaction server model and offers most of the same advantages. The peer model has the ability to flip-flop the relationship between clients and servers. The host machine can be either a client or server, depending on the transaction processing required by the application. The client and server can communicate using IBM's Advanced Program-to-Program Communications, TCP/IP or NETBIOS protocols.

The peer model is useful when desktop applications must respond to external events that are not user driven, such as preprogrammed time-of-day events like automatic back-ups or triggered applications that are kicked off automatically. Work flow processing, such as the delivery of documents to a workstation for processing by the user, is one example of peer type applications. The peer model was designed to provide programs with support functions for program-to-program communications.

This model also provides a distributed transaction processing (DTP) capability where two or more programs, residing on different hardware platforms, cooperate in order to perform certain required functions.

### DISTRIBUTED PRESENTATION

While DBMS, transaction processing and peer client/server models are ripe for new

# We came. We s

Of course, we're not normally ones to boast, but in this case, it's too hard to resist. Recently, *Communications Week* tested several internetworking devices in multi-protocol environments. 3Com's NETBuilder II® earned a perfect score in every single test scenario. The first perfect overall score recorded.

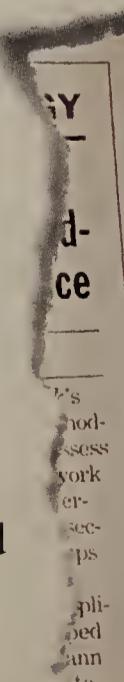
Anything they could dish out, this router could take.

Surprised? We weren't. After all, NETBuilder II was designed to be the most powerful, flexible router made.

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## First Perfect Ove

Cisco device takes a licking, but 3Com bridge-router keeps on ticki

By EDWIN E. MIER  
AND CHRIS GIULIANO

When bridge-routers from Cisco Systems Inc. and 3Com Corp. were evaluated for this installment of *Communications Week*'s mixed-LAN test program, it was 3Com's NetBuilder II that earned home the awards.

In fact, the NetBuilder II is the only bridge-router among the six tested to date in our series to command a perfect score for all test scenarios.

The NetBuilder II successfully handled the worst traffic scenarios we could throw at it, with out skipping a bit.

That performance, coupled with a price tag that is considerably lower than many oth



Circle Reader Service #18

er market leaders', 3Com's bridge-router an lent choice for users in neeting token-ring and E LANs.

In performance, Cisco bridge-router clearly l hind the 3Com devi MGS—a product that older than the vendor's 7000 series bridge-ro still marketed by Ci tested both at a user s our labs, despite the decision not to particip test program.

The Cisco bridge-r most adept at process net and Novell Inc. Int Packet Exchange traf handle the maximum DECnet traffic load in

Test

applications development, the distributed presentation model provides a link back to host systems, where substantial investments in applications already reside.

Distributed presentation is a client/server model that enables users to link front-end LAN applications to an existing host-based application without modification of the host application code. This remaps existing screen buffers, such as 3270 session displays, into client workstation GUIs. GUI constructs such as pull-down menus, dialogue boxes, radio buttons and push buttons can be introduced as a front-end to IBM 3270 mainframe applications.

Extensive processing logic can be introduced at the workstation level, such as data manipulation and formatting, conditional logic and access to local files and data. Some of these functions can eliminate processing that would have been performed by the host machine. Also, entirely new functions can be added, such as images and business graphics.

As companies integrate these client/server architectures into their enterprise networks, managing the network and infrastructure becomes a strategic imperative. The network infrastructure is changing drastically and becoming more complex. Client/server architectures need to be managed from an enterprise perspective. The challenges of managing LANs, wide-area networks, remote devices and interconnections are complicated by the lack of uniform standards.

Integrating different technologies from multiple vendors requires tremendous effort. Often, the tools to build multivendor, multi-protocol enterprise networks are missing. Lack of knowledge in using these technologies

If you're heading to INTEROP this week, you're invited to a free seminar, *Managing the migration to client/server architectures*. Sponsored by Network World, the seminar is scheduled for Wednesday, Aug. 25, from 1 p.m. to 1:50 p.m. in Room 122 at the Moscone Center.

is another stumbling block for net administrators.

Christian is manager of enterprise networking at Coopers & Lybrand. He oversees the evaluation, design and installation of client/server, LAN and WAN solutions for the firm's clients. He can be reached at (212) 259-1384.

## Help desk

Continued from page 2

Daniel Blum, a principal with Rapport Communication, a Tacoma Park, Md.-based consulting firm for the electronic messaging industry replies:

There are three types of point-to-point gateways you can consider: Message Handling System (MHS) gateways, Simple Mail Transfer Protocol (SMTP)-based gateways and X.400 gateways.

Da Vinci is a native MHS mail system, so if you decide on an MHS gateway, you only need a gateway on the Banyan side. In response to our inquiries, Banyan noted that there is an MHS

## NOS

Continued from page 79

users are coming back to tighten up security," Janusaitis says. "And they're finding it's a much more complex task than they thought."

### TRIED AND TRUE

Despite the promise of non-NOS-specific environments and harmonized applications, the distributed application development concept is still quite new to users, and many are hesitant to jump on the bandwagon so quickly.

For starters, because each platform is still tied to a specific vendor, users are wary of false promises. "I'm not looking for an application-based solution [to connect the different NOSes]. It's too proprietary," Donaldson says.

"I particularly have a hard time believing the AppWare is NOS-independent. Novell is the king of proprietary solutions."

There is certainly truth to users' fears. WOSA is, at this point, specifically for Windows-based applications.

And although Novell has said it will give developers the capability to write AppWare applications that can run within other vendors' environments, it will be NetWare-specific for quite some time.

The best solution, therefore, for now might be to keep loading those dual redirectors. But keep an eye to the future, when the distributed application development and the DCE platforms might be able to ease some of today's interoperability pains.

• Gillooly is a senior editor for Network World.

For an SMTP solution, you would need to deploy the SMTP gateway on both the Da Vinci and Banyan sides. On the Da Vinci side, two alternatives are Novell's SMTP for NetWare Global MHS and Computer Mail Systems' S-Bridge product.

To go the X.400 gateway route, Novell, Inc. representatives said you can pair a NetWare Loadable Module product called the Retix X.400 for NetWare Global MHS from Retix with a product on the Banyan side called VINES X.400 RTS from Zoomit, Inc. Since both of these products implement X.400 Message Transfer Agent functionality, messages from Da Vinci eMail would be translated into X.400 and conveyed to the VINES system.

For product information, contact Retix at (800) 255-2333 and Zoomit at (416) 866-7442.

For product information, call Novell at (800) 638-9273 or Computer Mail Systems at its number given above. On the Banyan side, two options are Banyan's SMTP Mail Gateway Option and Incognito Software, Inc.'s Intelligent SMTP Gateway for VINES.

For product information, call Banyan at (508) 898-1000 or Incognito at (604) 736-6720.

To enable binary file attachment over SMTP, make sure that both gateways support the same method of transferring binary files. □

# aw. We routed.

## Score Earned

### 3Com's Performance in a Mixed-LAN Environment

traffic streams from an Ethernet and a token-ring LAN were sent to a 3Com NetBuilder II bridge-router simultaneously. To reflect real-world conditions, packet sizes and the number of nodes on both LANs were varied. The traffic load was increased in 10 percent increments, up to the maximum that can be exchanged between the LANs in each scenario. The figures in the graphs represent (as percentages of the maximum possible) the levels at which the device processed bidirectional traffic before it began to drop packets. Results are given for each routed protocol tested and for transparent bridging.

No. of nodes	Packet size in bytes				
	Ethernet to token-ring				
Ethernet/token-ring	64	128	512	128	64
100/1	100%	100%	100%	100%	100%
50/50	100%	100%	100%	100%	100%
1/100	100%	100%	100%	100%	100%
100/100	100%	100%	100%	100%	100%
	512	512	128	128	64

No. of nodes	Packet size in bytes				
	Token-ring to Ethernet				
Ethernet/token-ring	64	512	1,500	128	64
100/1	100%	100%	100%	100%	100%
50/50	100%	100%	100%	100%	100%
1/100	100%	100%	100%	100%	100%
100/100	100%	100%	100%	100%	100%
	1,500	512	64	128	64

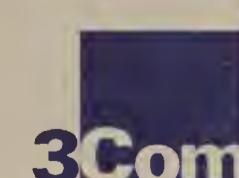
NetBIOS/NetBEUI, Banyan VINES, DECnet, XNS, OSI, and TCP/IP protocols. Not to mention any LAN or WAN media, including FDDI and other high-speed media that come along.

NETBuilder's modular design means interface, media, topology, and technology changes can be made in no time. Plus, hot-swappable modules make network problems easy to repair, with absolutely no interruption in service. In fact, meantime board replacement is less than five minutes. Want to know more about NETBuilder II? Give us a call at 1-800-NET-3Com.

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BY KELLY JACKSON HIGGINS

**N**ever mind the Great Flood of '93 — a rain shower could have wiped out the crude communications link buried under the field separating Litton Industries, Inc.'s Advanced Circuitry Division and Inter-Pak Electronics Division in Springfield, Mo.

But in 1991, the circuit board manufacturer began a major network overhaul, part of which entailed tearing out the battered underground telephone wire and digging a new trench for a fiber-optic cable link between the sites.

That link let the technical staff at Advanced Circuitry fashion a full-blown token-ring data highway for running the shop floor and business side of both Litton divisions.

The network now unites a mix of computer systems that support the ordering and design and manufacturing of both circuit boards at Advanced Circuitry and backplanes at Inter-Pak Electronics.

"We didn't set out to build an open system," says Sue Cochran, who in 1991, as the new manager of information systems, led the technology revolution at the company. "We were just solving a business problem."

The problem was a classic islands-of-information scenario. Litton Advanced Circuitry had two computer system environments: a host system for ordering, planning and manufacturing products and a Unix workstation system for the product designs.

Neither system knew the other existed, so data from one had to be manually entered into the other. That slowed the manufacturing process to anything but real time and left the system prone to human error. The cost of design mistakes? An estimated \$250,000 a year in scrap material.

"If someone dropped the ball updating the other end, you might end up with two versions of a circuit board design that didn't match up," says Cochran, whose technical staff of six supports both Advanced Circuitry and Inter-Pak Electronics.

From across a field, Inter-Pak shared data for the production of its backplanes via a dial-up link. Since one-third of Inter-Pak's orders come from Advanced Circuitry, it was crucial that the two shared a more reliable communications pipe.

#### A TOKEN LAN

Cochran was hired to tackle Litton's communications dilemma. What she saw on her first day at Advanced Circuitry, however, was shocking — \$45,000

# Forging a link to the future

*Litton Industries devises an ingenious plan to connect manufacturing and CAD/CAM nets in its Advanced Circuitry and Inter-Pak Electronics Divisions.*

worth of token-ring technology used only to physically link the organization's IBM Application System/400 minicomputer to 60 personal computers emulating IBM 5250 terminals. There was no local-area network to speak of.

"These resources were just sitting there, not being utilized," Cochran says.

And that wasn't the worst of it. The computer-aided design and manufacturing (CAD/CAM) network of Unix workstations handling the design and some of the manufacturing machinery was separated from the AS/400, which gathered the manufacturing orders and specifications.

Reams of paper information generated by the AS/400's manufacturing-resource planning software, Data 3 from Santa Clara, Calif.-based ASK Software, Inc., sat in piles on the floor in the CAD/CAM area of the manufacturing plant, awaiting manual input into the CAD/CAM workstations.

The division was running its business with data that was up to three days old. "The data was old, and people weren't getting it when they needed it," Cochran says.

That meant shuttling data around by sneakernet and a lot of manual input. "People had to go out on the manufacturing floor and find the updated information," she says. "You just can't run a business on information that is several days old."

So Cochran spent her first month on the job talking to end users and touring the shop floor to study how to better automate Litton's manufacturing technology.

"I told them not to expect to find me in my office for that month. I was on my feet finding out what people needed to do their jobs," she says.

#### THE SOLUTION

Cochran came up with a solution that wasn't especially leading edge, but it was unique.

The first step was simple: to exploit the token-ring infrastructure more fully, to use it for more than a way to hard-wire terminals to minicomputers. All that took

**Continued on page 90**

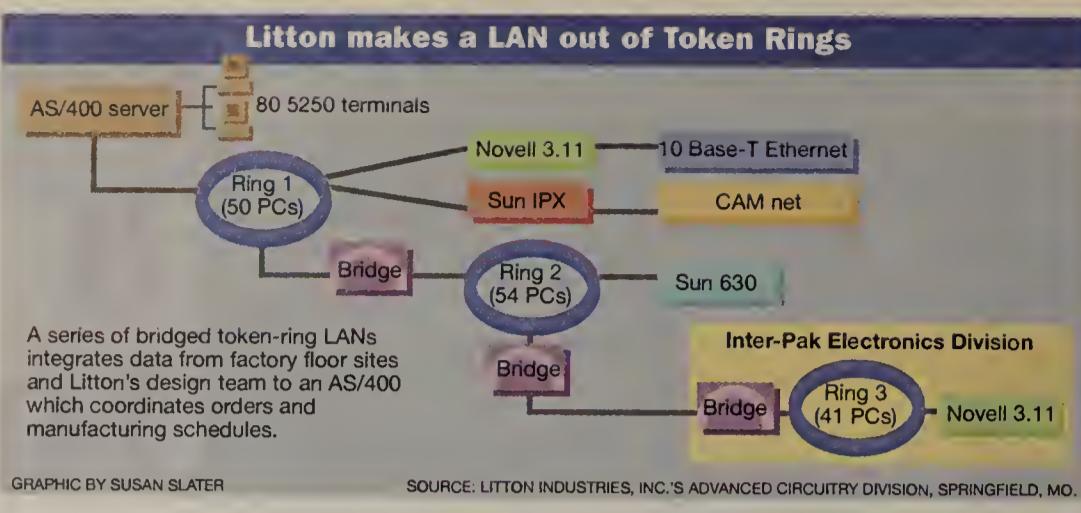
Continued from page 89

was adding a DOS-based file server and some Novell, Inc. NetWare 2.2 software to enable the PCs to be used in a client/server LAN mode rather than simply as terminals.

Litton was able to cost-justify the new file server within 30 days because it let the AS/400 share data with the IBM DOS-based PCs on a peer-to-peer basis.

But that was only one piece of the puzzle. Data collection was another.

In manufacturing, tracking the progress of a product being built on the shop floor is crucial. With Litton's old system, the different



computers rarely had up-to-date data on the status of circuit boards being manufactured. That meant that factory workers had to walk the shop floor to check on a board's progress.

So under Cochran's supervision, Litton automated its shop floor data collection using bar-code technology. Each circuit board was outfitted with a bar code, which provides information on the board's status during each step of the manufacturing process.

Litton explored several options, including proprietary bar-code readers that required their own computer language, equipment and special wiring, not Litton's standard twisted-pair wiring. They were also expensive — \$2,000 per station. Furthermore, this option would have meant establishing a third island of information.

"We were stressing timeliness and speed, so proprietary systems were too slow," Cochran says.

Since the AS/400 needed to be shut down for a backup during one of the company's three daily shifts, the AS/400 wasn't a candidate for data capture. Cochran and her staff selected a LAN-based approach whereby PCs outfitted with data-capture technology are fed data from bar-code readers in real time.

These workstations run Network File System (NFS) software from Beame & Whiteside Software, Ltd. to communicate with a Sun Microsystems, Inc. Unix-based server on the token ring. The company opted for the Sun box because it can handle the high volume of transactions — 250,000 per month — better than a NetWare server could. The manufacturing transactions cover everything from the photographic filming process to the etching and cleaning of the circuit boards.

## INTEROPERABILITY PROGRESS

The most unique aspect of Litton's LAN is it does not rely on upper layer networking protocols as the lingua franca of the computers and equipment mix. Cochran and her staff opted for a database management system, Progress Software Corp.'s Progress software, to meld data inconsistencies. The product transfers transaction records, rather than files, among dissimilar systems.

Progress is an application development environment that runs on Litton's AS/400, Sun 630 Unix server and IBM PC platforms. Among the applications based on Progress are the data capture application and a communications handler, which passes data among the different platforms, says Joe Chappell, manager of AS/400 marketing for Progress in Bedford, Mass.

"The software works at the application level," Chappell says. That means when a DOS machine is sending an update to the AS/400, Progress' communications software decides how to route the message. IBM Systems Application Architecture software on the AS/400 talks to the NetWare environment.

The Unix workstations access the AS/400 through the NetWare client machines, with Progress riding on top of the Transmission Control Protocol/Internet Protocol built into Unix.

Data is stored in the underlying databases: Progress database software on the OS/2 and Unix computers, and IBM's own database on the AS/400. "Progress turned our AS/400 from a host to a server," Cochran says.

All of that results in what Cochran calls "near-time," or close to real-time, operations. Because the process is so distributed, it can take 10 to 15 minutes for transactions to be

Continued on page 92

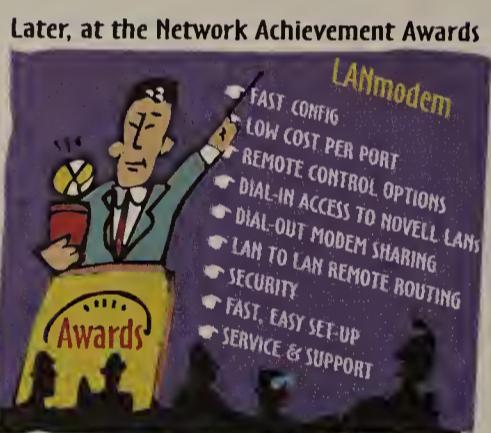
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## Understanding SNMP and SNMPv2

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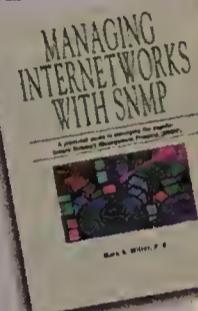
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# Litton

Continued from page 90

posted on the AS/400. That's a far cry from the early days when it took three days to update the data.

Advanced Circuitry's use of Progress differs from what most user organizations are deploying today — straight TCP/IP. Although TCP/IP would provide a more direct link, Cochran and her staff avoided it.

"TCP/IP needs too much babysitting," she says.

### RUBBER HITS THE ROAD

But the token ring LAN, which Litton calls the data highway, is the main tool for its open system, Cochran says.

## Letters

Continued from page 73

sumer's sponsor or the taxpayer.

I think Mr. Welch should have some empathy for Novell. After all, as rapidly as technology is advancing, how can Novell worry about tweaking its training program?

At this point, Novell's bigger concern is whether it can patch up NetWare 4.0 to meet enterprise networking needs.

I'd bet that by now many educational systems have factual information about the software we call a network operating system somewhere in the curricula.

As Mr. Welch points out, the demand is there. Being studied and dissected in schools will surely aid the evolution of our local- and wide-area networking products and help fulfill the need for good LAN people.

Using myself as a case study, I can point out how the educational system helps meet demand.

Based primarily on the telecommunications engineering and information theory I learned in a progressive master's degree program circa 1982, I have been able to learn, operate and manage several different types of networks, including LANs and WANs.

In 1987, thrust into a job as a LAN administrator without any courses, I found becoming personal computer-literate and obtaining a good working knowledge of LAN administration in a Banyan Systems, Inc. VINES environ-

The LAN consists of three rings connected by three Andrew Systems, Inc. bridges. One of those rings is the Inter-Pak ring, which is linked to the Advanced Circuitry site by the fiber-optic cable.

A second ring supports the Sun 630 server and client machines, and a third ties the NetWare and Sun NetWare servers that sit between the Ethernet LANs and the token ring. One of those Ethernet LANs is the CAD/CAM network.

Cochran says there is no need for routing at this time. "If we had a high volume of data traffic that needed to be segmented, then we would buy a router," she says.

The bottom line was simplicity — the ability to run anything off the same twisted-pair wiring scheme and having as few operating systems as possible.

ment to be relatively easy.

In fact, I found that my formal education and experience in communications often helped me understand vendor literature.

Granted, I had very capable mentors to help me, adequate documentation, good vendor support, a patient boss and understanding customers — but then, who doesn't? (Ha, ha!)

My conclusion: If the job market is really being driven by the CNE certificate, then be ready to pay the big bucks to get one. But I don't think it is.

**William Smith**  
Network engineer  
Global Systems Technology, Inc.  
Washington, D.C.

## Something for nothing

All companies make good money through service and support. But Novell, Inc. has outdone them all with its Certified Network Engineer (CNE) scam.

You have to admire a company that can pass its support responsibilities off and make a hefty profit in the process.

However, Mr. Welch's proposal to make the CNE more affordable was very disturbing. Independent educational institutions should not be in the business of shilling for Novell.

Companies such as Digital Equipment Corp. routinely donate resources to universi-

Although Ethernet LANs are less expensive, Litton opted for token ring because it requires less technical expertise, Cochran says. That's a major consideration for Litton's two divisions, given there are only six technical support staffers for 600 users.

"If a node goes down on the token ring, it's smart enough to take care of it automatically. With Ethernet, the whole network goes down, and you need a techie to fix it," according to Cochran.

The next frontier for Litton is imaging technology, which would streamline the manufacturing process but also add to traffic jams. That is where a router-based internet might come in, Cochran says.

♦ Higgins is a free-lance writer based in Standardsville, Va.

ties. Novell can afford to do the same.

In return, Novell will get its reward down the road in the form of a large pool of people comfortable with its products. To suggest that Novell be guaranteed a minimal return is outrageous.

If Novell can't find it in itself to give something away for nothing (and after opening my new \$200 Network Technology Training Kit and finding . . . Cliff Notes! I have my doubts), then perhaps the other beneficiaries of the CNE — the personnel offices of America — could be persuaded to subsidize the program.

**Jim Glockling**  
Assistant staff  
MIT Lincoln Laboratory  
Lexington, Mass.

## CORRECTIONS

Due to an editing error, Team Software, Inc.'s telephone number was left off a Buyer's Guide chart on group collaboration tools (Aug. 9, page 51).

The number is: (703) 784-4480.

Due to a typographical error, the Internet address appearing at the end of Douglas Welch's column (Aug. 2, page 33) omitted one letter.

His correct Internet address is: dewelch@qedbbs.com.

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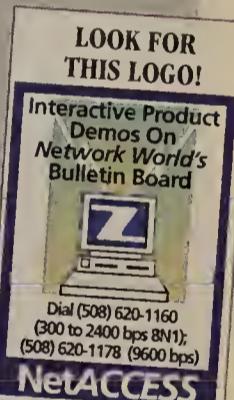
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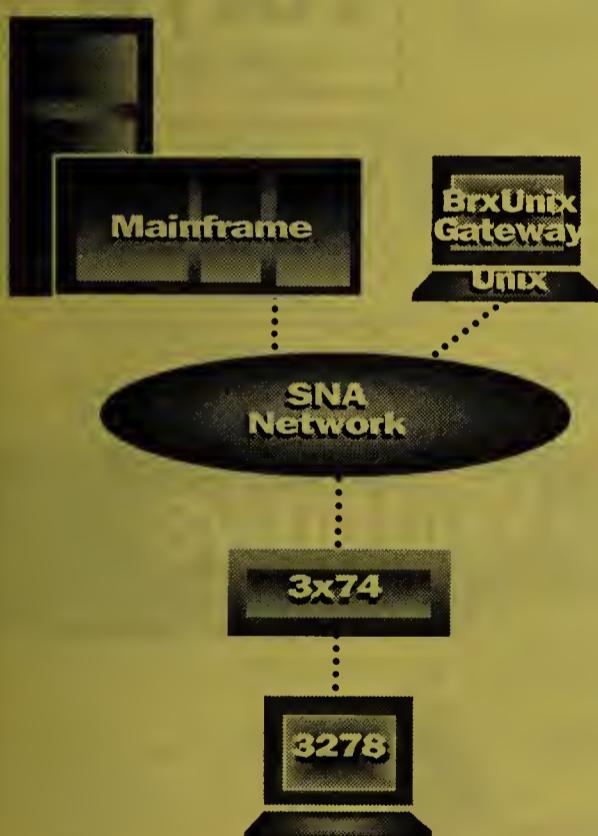
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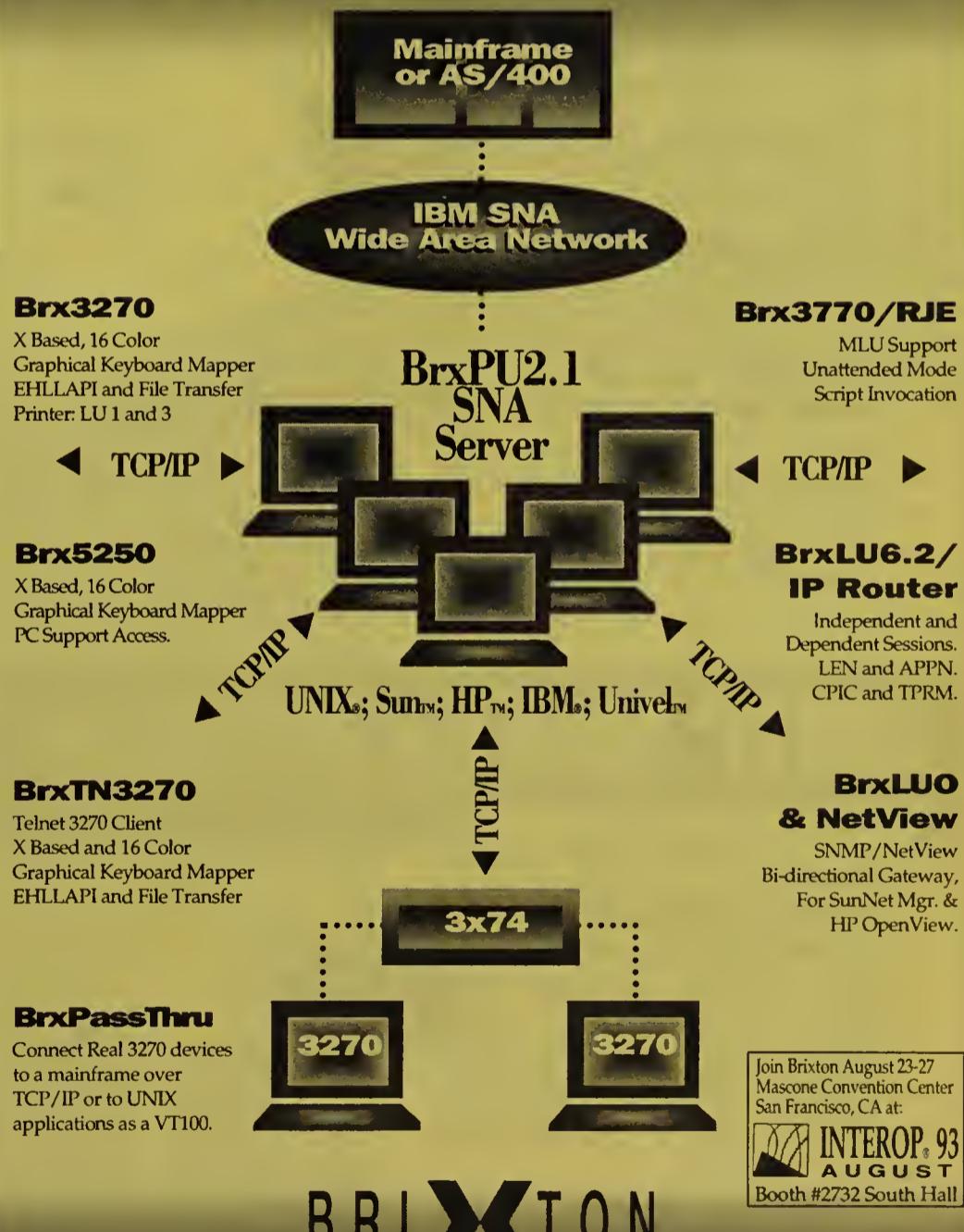
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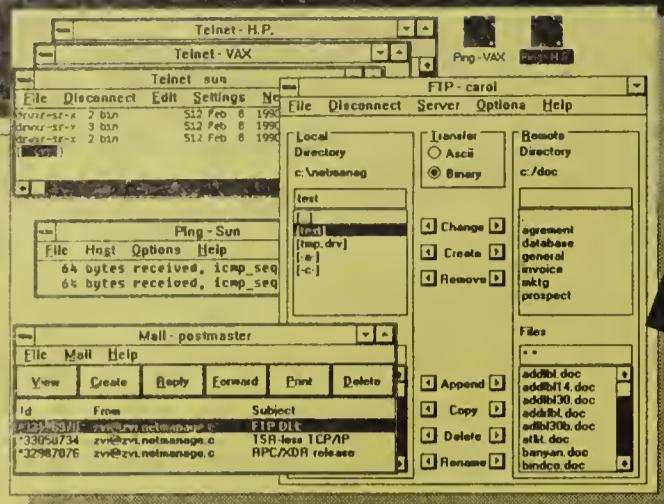
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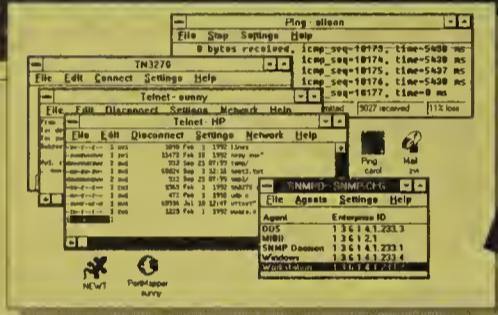
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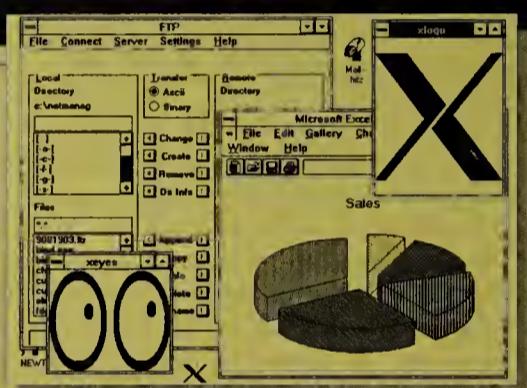
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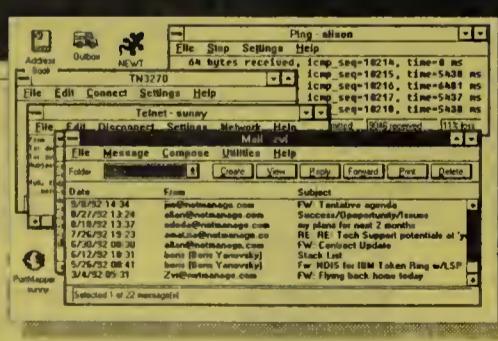
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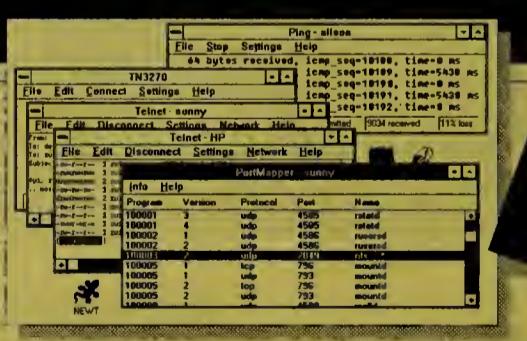
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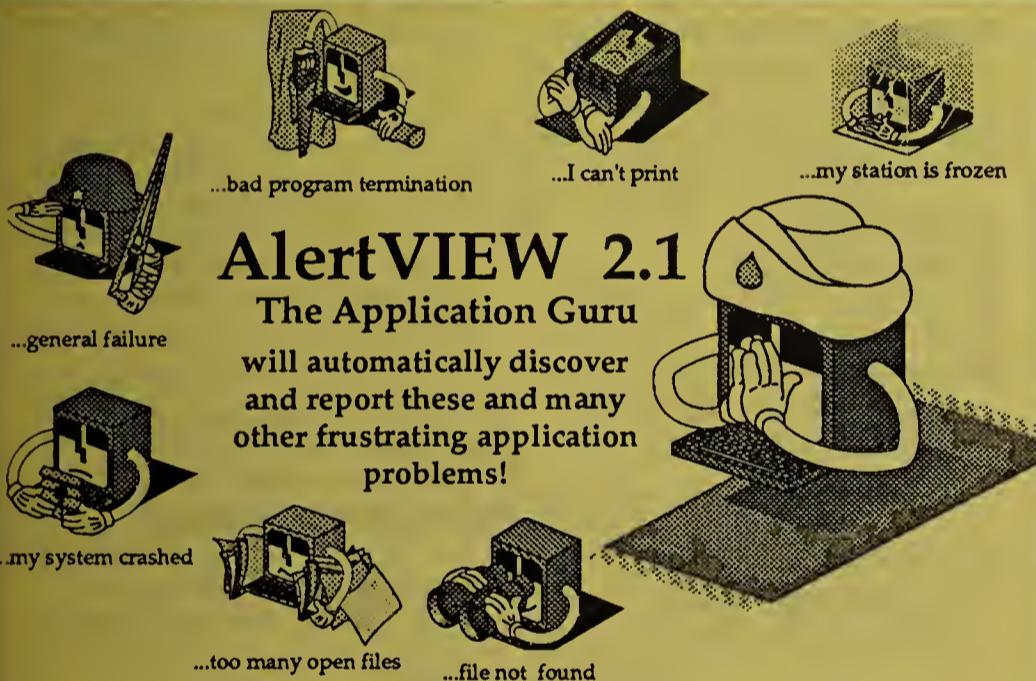
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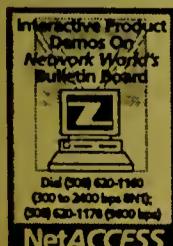


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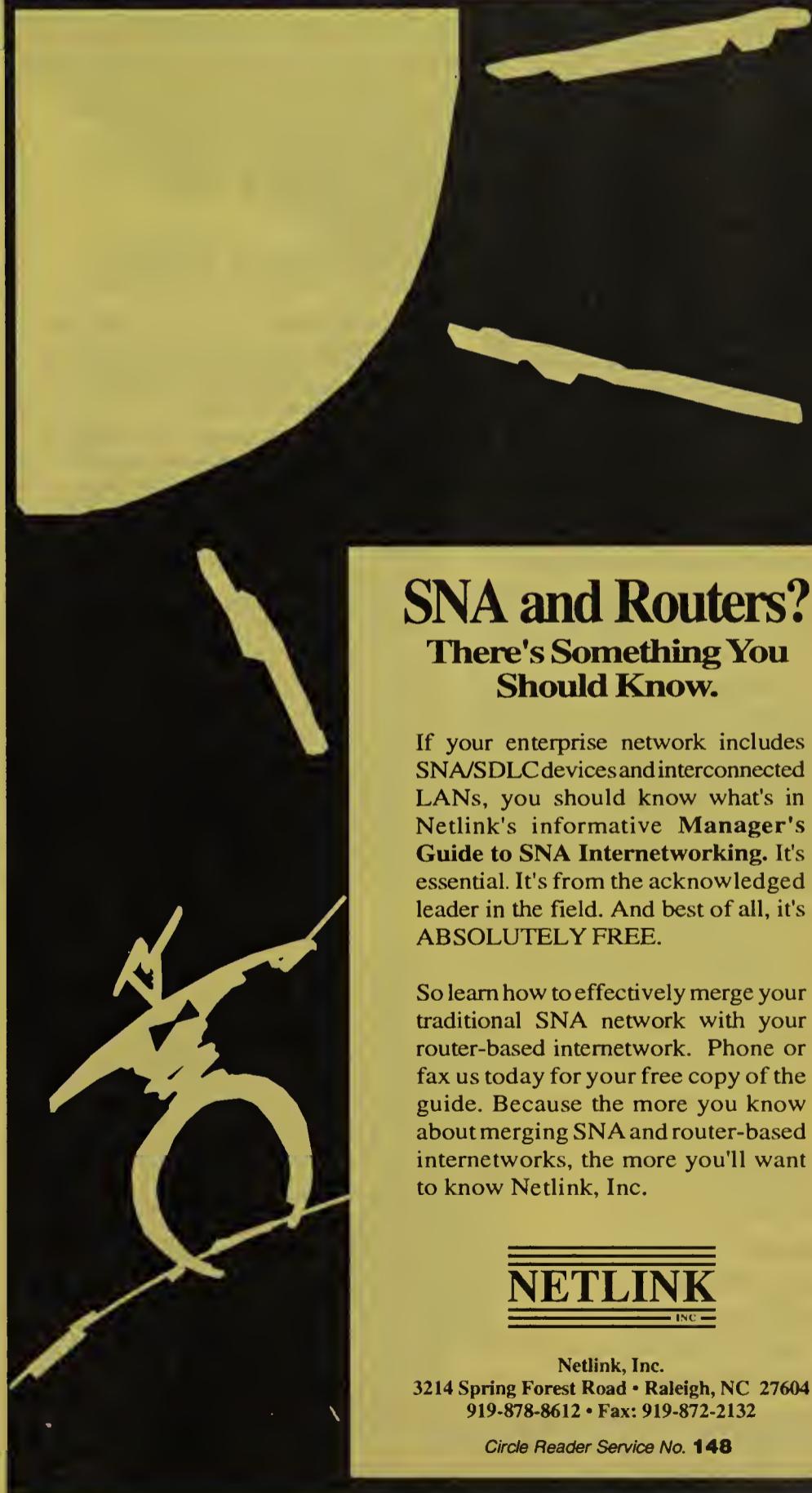
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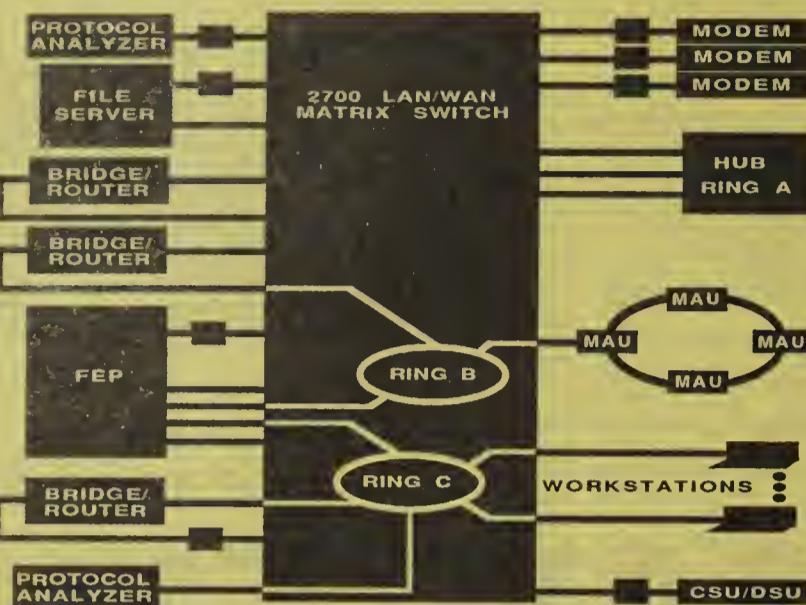
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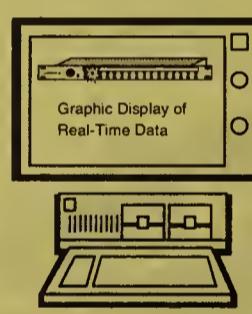
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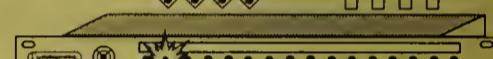
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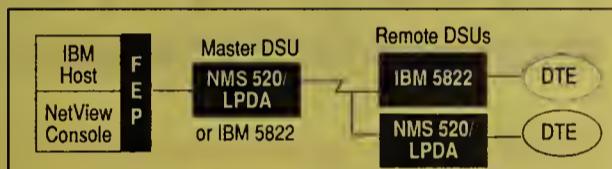
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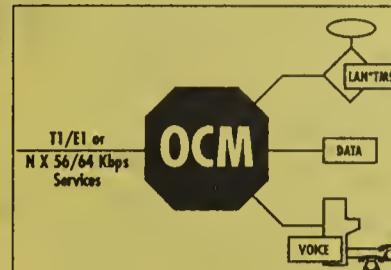
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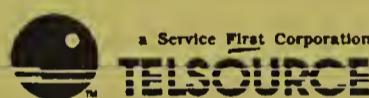
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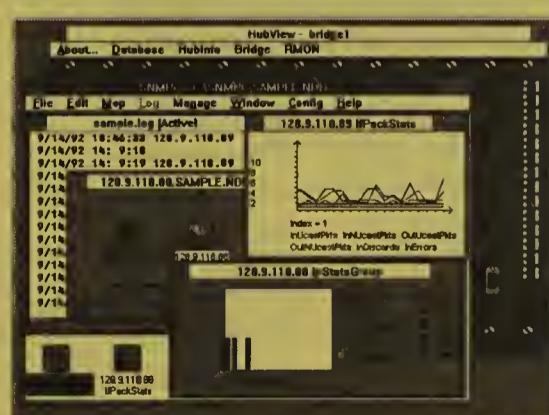
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- Request for sales call
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- Request for information

2. Purchase timeframe

- Within 60 days  Within one year
- Within six months

3. Scope of purchase responsibility

- Enterprise wide  Departmental

4. Purchase influence/number of sites

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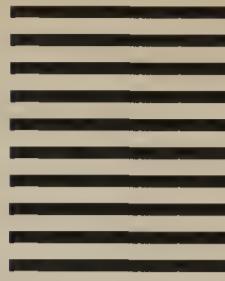
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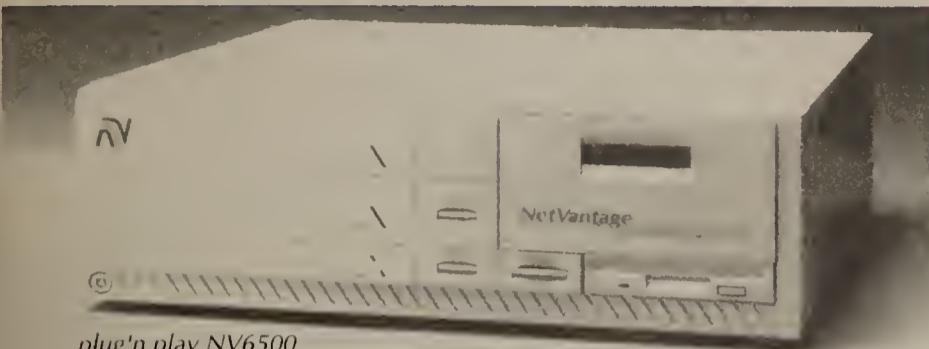
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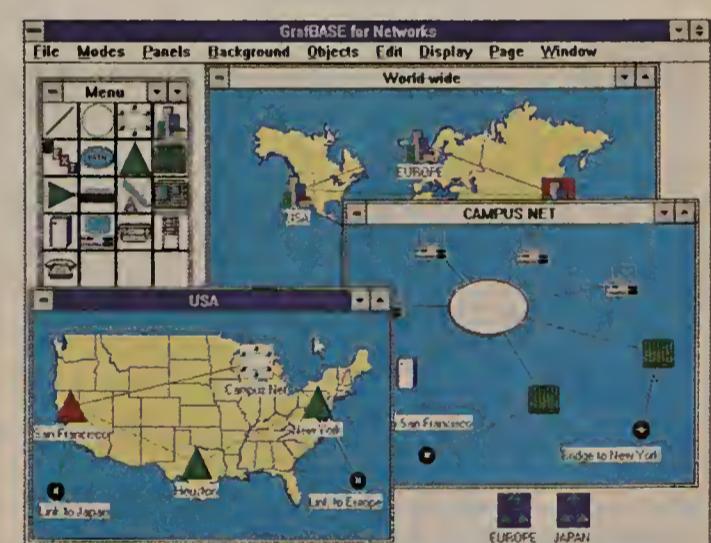
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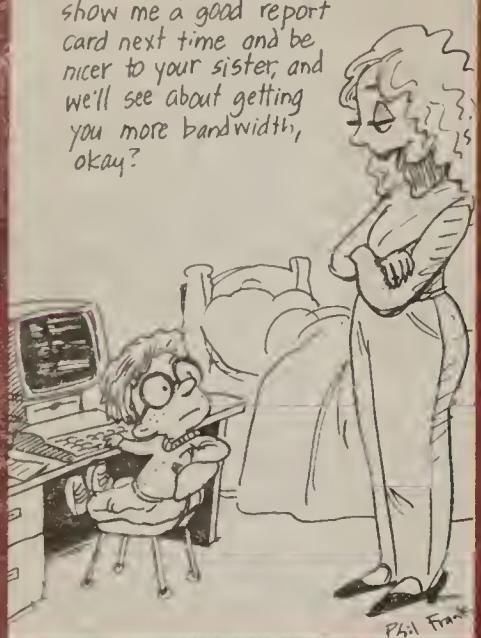
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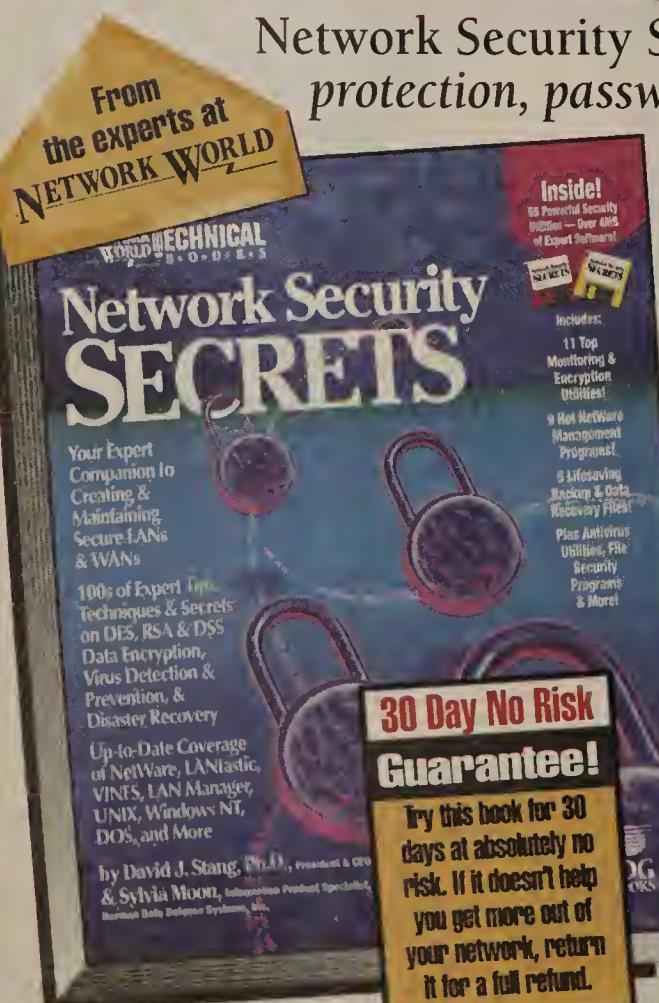
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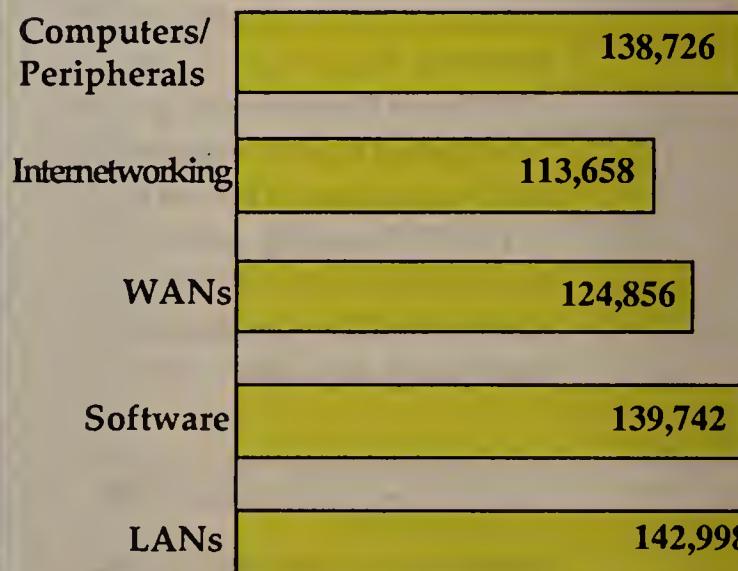
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# Networking Careers

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If you're planning on attending Interop, stop by and see us at the Sheraton at Fisherman's Wharf, 2500 Mason Street, San Francisco, California. We will be interviewing for the positions listed below in the North Beach and Presidio Rooms on Wednesday, August 25, from 8:00am to 8:00pm, and on Thursday, August 26, from 8:00am to 12:00pm (noon). For directions to the hotel, contact the Sheraton at (415) 362-5500.

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### SENIOR SOFTWARE ENGINEER

Seeking a key team member who will architect, design & develop a Network Management System for hubs & ATM based products. Expertise in software development methodology, data communication (LAN & WAN), Unix, Internet protocols, X-Windows, and object oriented programming are required. Experience with systems such as HP-Open View & SNM is highly desirable. Knowledge of RDBMS and expert systems is a plus. 10-15 years experience and a BSEE/CS are required; Master's preferred. Job Code: NW/SSEE-I

### SENIOR SOFTWARE ENGINEER

This position will define, design, implement, test & document Network Management System software for MS-Windows & NT operating system environments. Must have 3+ years of solid Windows programming using SDK, and 2 years of object oriented programming using C++, plus exposure to Internetworking TCP/IP & SNMP protocols. Expertise in software development methodology and MS-DOS internals is desired. Experience in database engine design & interface, and familiarity with NT's architecture and porting existing applications to NT is a plus. BSEE/CS required. Job Code: NW/SSE-II

### HARDWARE PROJECT MANAGER

This position will lead a team developing the hardware for a Giga-bit throughput switched hub with an emphasis on Gate Array design. The person filling this position will also be involved in the system design of the hub. Experience in hardware intensive telecom and datacom design is essential. A minimum of 10 years experience in this area including at least 5 years in a leadership position is required. BSEE required; Master's Degree preferred. Job Code: NW/HPM

### SENIOR HARDWARE ENGINEER

This position will be a major contributor in design and implementation of modules for a Giga-bit throughput switched hub with an emphasis on Gate Array design, 8-10 years experience with Gate Array implementation and CAD based design including simulation using Mentor 8.1 or equivalent. Experience with hardware intensive (limited or no CPU intervention) CMOS design at 25Mhz and above. C language and knowledge of telecom and datacomm design are required. Job Code: NW/SHE

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Correspondence, including a letter of application, curriculum vitae, and a list of three references, should be sent to Dan Jordt, Director of Technical Services, NorthWestNet, 15400 SE 30th Place, Suite 202, Bellevue, WA 98007. Review of applications begins September 8, 1993.

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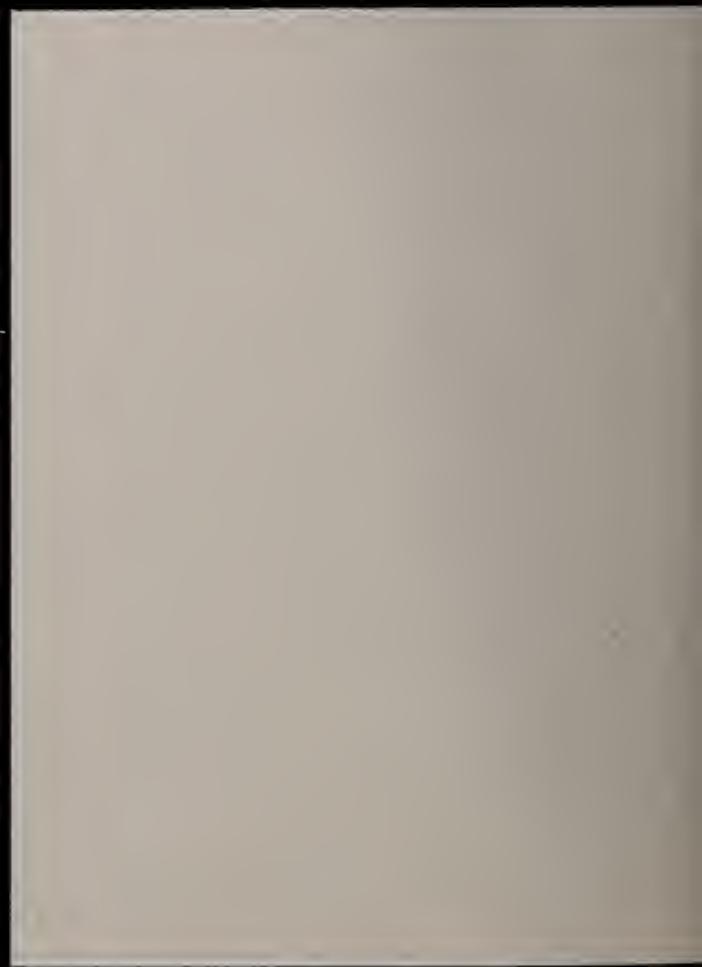
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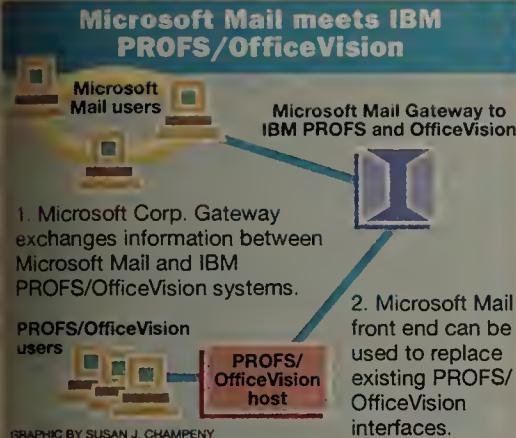
# Microsoft's apps target PROFS users

BY BOB BROWN

Redmond, Wash.

Microsoft Corp. this week will announce a couple of tools designed to make it easier for users to migrate from host-based to local-area network-based electronic mail.

Microsoft will unwrap Version 3.4 of its Microsoft Mail Gateway to IBM PROFS and OfficeVision with a new feature that lets users of Microsoft's Schedule+ group scheduler check for free time on the schedules of Professional Office System (PROFS) users and vice versa. Schedule+ is tightly integrated with Microsoft Mail.



The firm will also offer The Microsoft Mail Driver for IBM PROFS and OfficeVision, which lets users employ Microsoft Mail as a front end to a PROFS/OfficeVision mail system. The driver gives users the option of gradually moving to Microsoft Mail by using an improved interface without swapping out the PROFS/OfficeVision back end immediately. End users benefit from Windows' Microsoft Mail interface, Object Linking and Embedding and other standard Microsoft Mail features.

"It's a fact of life that [users] are going to have PROFS around for a while, so we want to integrate these systems and provide a migration path to Microsoft Mail," said Thom McCann, a Microsoft Mail product manager.

The enhanced gateway supports the exchange of messages, directories and scheduling information between PROFS/OfficeVision and Microsoft Mail systems. The gateway swaps scheduling information between E-mail

systems at user-specified intervals.

Microsoft's efforts to better integrate its scheduling features with those of PROFS/OfficeVision systems are part of a trend among E-mail vendors looking to woo users of IBM's host office systems over to their E-mail systems. WordPerfect Corp. recently announced a new version of its WordPerfect Office OfficeVision/VM Gateway 4.0 for OS/2 with expanded capabilities for integrated messaging and group scheduling.

The gateway requires an Intel Corp. 80286 or higher personal computer, 270K bytes of memory, 3270 emulation hardware or the Dig-

ital Communications Associates, Inc./Microsoft Communications Server 1.1.

Kevin Ryan, director of E-mail services at Aetna Life & Casualty, Inc. in Hartford, Conn., said the products could be useful for his company, which is moving from a hodgepodge of E-mail systems to a few strategic platforms, including Microsoft Mail and OfficeVision/VM. A gateway that tightly integrates scheduling features in the host and LAN worlds "sounds attractive," he said.

Version 3.4 of the gateway is available now and consists of three components. The gateway software costs \$4,995, while the component

that resides on the Microsoft Mail post office costs \$995, and a host component is priced at \$14,995.

The driver is available and will be sold through Microsoft Consulting Services. Installation charges related to reworking the PROFS/OfficeVision host software will cost \$30,000, and there will be a \$15 per-user charge (with a minimum of 2,000 drivers) and a Microsoft Mail client license charge. A five-user pack of Microsoft Mail costs \$395, and volume discounts are available.

©Microsoft: (206) 637-9307 (gateway), (800) 922-9446 (driver).

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Circle Reader Service #17

## Start-up

Continued from page 4

ers, Ltd., RSA Data Security, Inc. and Oracle Corp.

CACI makes the modeling system, while Inference provides the AI engine. Network Managers develops SNMP management software, and Oracle7 distributed database provides a single, logical data repository. RSA's public-key encryption technology ensures data security as it traverses a network.

Arkhon was founded by President and Chief Executive Officer Stan Tomsic, a former principal at MVS Software, and Overby, a former systems architect at Bank of America. The company is privately funded, employs eight people and is headquartered in Cerritos, Calif.

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# McCaw

Continued from page 31

EO subsidiary under a stock-swap plan.

Mike Homer, vice president of marketing and software engineering at GO, said EO, NEC, Matsushita Electric Industrial Company, Ltd. and Toshiba Corp. are committed to fielding a new generation of Hobbit-based personal communicators with transceivers capable of using today's circuit-switched cellular service or the upcoming cellular packet-switched service called Cellular Digital Packet Data (CDPD).

"Services based on CDPD are critical to McCaw customers that use portable computers, fax machines and pagers," said Probe Research's Bernstein. "AT&T needs McCaw so it can reach much more of the rapidly expanding mobile work force."

McCaw this month began its planned deployment of CDPD technology, the spectrum-sharing method developed by IBM that allows data to be sent at 19.2K bit/sec during idle times on cellular voice channels.

According to The Yankee Group, a Boston consulting and research firm, McCaw is pouring \$250 million into this effort. McCaw plans to support CDPD on roughly half of its national network by year end, with all of its 105 markets supporting the technology by the middle of next year.

Using CDPD to send data will be less expensive, use less battery power and support greater data integrity than circuit-switched cellular service, said GO's Homer.

AT&T's purchase of McCaw gives AT&T a strong influence in the rollout of CDPD and in efforts to ensure interoperability of CDPD-capable devices, which AT&T strongly wants to promote, said AT&T spokesman Kevin Compton. Technology from General Magic, which EO will include in its devices, is intended to promote interoperability among equipment using different operating systems, such as Apple Computer, Inc.'s Newton personal communicator, he added.

In addition to new personal communicators, AT&T is also gearing up to build traditional voice cellular handsets at its Little Rock, Ark., facility.

## USER VIEWS

For the most part, users were enthusiastic about the merger, although they reserved judgment on how it might affect their network operations.

"It appears to be a positive step for both companies," said Robert Hamilton, president of the Tele-Communications Association, Inc., a major user group comprising more than 100 companies. "It could foster greater competition in the cellular market, which would be great. But we're going to wait and see what comes out before changing our networking strategy."

Hamilton added that he would like to see the companies do more than just offer telephone service to workers on the go. "We're looking for extended voice mail, pager and E-mail services."

Other users expressed interest in cellular access to AT&T's net. "We use cellular access to our Software-Defined Network on a beta basis from about 750 phones, and we think it's great," said Donn Greiner, a telecommunications analyst with United Services Automobile Association's Information Services Unit in San Antonio, Texas. "We'd be excited if we could use one company for cellular access rather

than many."

Greiner said he wants to know more about AT&T's cellular rates. "I assume they will be very competitive and provide me savings over what I have today."

"If the merger goes through, it'll be good for the cellular industry. There will be more competition and, hopefully, lower prices," said Michael Kilbane, general manager of systems development for Diamond Shamrock Refining and Marketing Company, Inc. in San Antonio and president of the International Communications Association, a national user group. "But companies can't continue to sell cellular service as a commodity. AT&T will have to show me how cellular fits into our total networking strategy."

Industry analysts who track AT&T speculated on what the future will hold for users if the merger is carried out as planned.

According to Bernstein, AT&T will use the McCaw cellular network to offer mobile users anywhere in the U.S. its basic voice calling services. Although AT&T's domestic voice net serves users in cities and towns of all sizes, today's worker on the run cannot always reach a wireline phone to the carrier's network.

Mark Lowenstein, associate director of the wireless and mobile communications program at The Yankee Group, predicted that AT&T will enable its calling card service users to make cellular phone calls. "There's no reason why people with AT&T's Corporate Calling Card and Universal Card can't use them to make wireless calls," he said. "And you can expect to see consolidated billing for those calls and calls that use [landlines]."

Industry watchers predict that AT&T will add intelligence to the McCaw network that will enable it to support AT&T EasyLink electronic mail and, possibly, voice mail services. They speculated that AT&T will package cellular service with personal communicators or with landline offerings.

"Users will probably see AT&T bundle existing calling services with cellular [offerings] and bring usage from both under a single-

volume discount plan," said Mark Langner, a senior analyst with TeleChoice, Inc., a Verona, N.J., consultancy.

Langner noted that AT&T will probably offer consolidated billing for landline and cellular services. "There are users that have thousands of cellular phones spread across the country and desperately need to gain control of them," he said. "Consolidated billing would be a huge benefit."

"There are users that have thousands of cellular phones spread across the country and desperately need to gain control of them," he said. "Consolidated billing would be a huge benefit."

## Awaiting approval

The AT&T/McCaw stock-swap merger proposal is subject to the approval of several federal and state regulatory authorities that will review whether the deal violates any antitrust laws or telecommunications regulations. The Securities and Exchange Commission, the Department of Justice, the Federal Communications Commission and state regulatory authorities in areas where McCaw Cellular Communications, Inc. operates will hear opposition to the merger during the upcoming months.

Some regional Bell holding companies are already complaining that the merger should not receive approval until they are allowed "to compete on equal footing" with AT&T by being allowed to enter markets now off-limits to them under the Modified Final Judgment.

"It's time to let all companies compete equally," said Edward Whitacre, Southwestern Bell Corp.'s chairman and chief executive officer. "If this transaction is going to be approved, the Bells should be free to offer long-distance services and manufacturing, too."

Whitacre said the McCaw merger means that "the AT&T of 1993 will look like the AT&T of 1983" before it was divested of its local companies under court order.

"When completed, this deal will enhance AT&T's ability to deliver long-distance service to cellular customers and deliver local exchange service through cellular systems," argued Dick Odgers, Pacific Telesis Group's executive vice president. He added that the Bell companies, which also operate cellular services throughout the country, need the same kind of opportunity to compete with AT&T.

Ameritech Vice Chairman Richard Brown said the MFJ market barriers should be lifted since AT&T will now compete with Ameritech and other Bell companies in the local loop.

But AT&T Chairman Robert Allen countered that 99% of cellular calls pass through, rather than replace, the local loop. "It'll be years — if ever — before that changes," he said.

FCC Chairman James Quello said the merger promises "great future potential" for the wireless industry but cautioned that the FCC will closely review "valid opposition" to the merger before allowing the McCaw cellular licenses to be transferred to AT&T.

Congress may decide to get involved in the approvals process, too. "This deal shows how technology can push established companies in new directions, and entrepreneurial companies can realize the gain," said Rep. Edward Markey (D-Mass.). "I am concerned, however, that the marketplace may be putting back together what the Justice Department and the courts 10 years ago put asunder."

Despite their complaints, no Bell company contacted could point to specific legal problems that might delay the merger, although some said their lawyers are looking hard and plan to submit their views as part of the regulatory approval process.

BY ELLEN MESSMER



## Our New DataCenter Hub

And for good reason. What you're probably using now for LAN-to-IBM host connectivity is a confusing, complicated combination of products that just doesn't add up to an efficient, total network solution.

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# Fore

Continued from page 1

The new 155M bit/sec OC-3c Network Module for the company's ASX-100 ForeRunner and ASX-100 SwitchCluster ATM switches has four ports that support the full Synchronous Optical Network (SONET) Optical Carrier (OC)-3 rate of 155M bit/sec. It complements the company's existing 100M and 140M bit/sec interfaces.

The module can be used to connect to other ForeRunner switches, ATM desktop adapters supporting SONET or its European counterpart — Synchronous Digital Hierarchy — ATM-ready hubs and routers, as well as campus backbone multiplexers.

It can support any combination of multi-

mode fiber connections for LAN use, short-reach single-mode fiber connections for campus networks or long-reach single-mode fiber links for backbone and wide-area connectivity. Available now, it costs \$6,995.

Fore is also jointly developing a switch interface with silicon vendor PMC Sierra Corp. that will support the E-3 rate of 34M bit/sec. That interface will be available in the first half of next year.

On the adapter card front, Fore this week will roll out products for machines based on the Extended Industry Standard Architecture (EISA) and the Micro Channel Architecture (MCA). Initial drivers for the \$3,495 cards will be available for Hewlett-Packard Co. HP 700 Series and Silicon Graphics, Inc. Indigo-2 EISA-based platforms and IBM's MCA-based RISC System/6000.

The ESA-200 EISA/ATM Adapter is available now, while the MCA-200 will be available first-quarter 1994.

Drivers for other EISA- and MCA-based devices, including personal computers, will be available in the near future at much lower prices. "This is an area our partnership with 3Com will come into play because we can leverage their adapter expertise," Juliano said.

Fore also announced a new price for its most popular adapter card — the SBA-100 for Sun Microsystems, Inc. SBus-based machines — that now costs \$1,295. Fore had just decreased the price of the interface from \$3,995 to \$1,995 in March.

While the products may be in place now, Fore needs help from other vendors to expand its presence, hence the new deal with 3Com. Under terms of the agreement, 3Com will

comarket and resell Fore's switches.

3Com had been shopping for an ATM switch partner for several months to provide the last piece of its High Performance Scalable Networking strategy. That plan is designed to enable users to build routed, ATM-collapsed backbones using 3Com's NetBuilder II router, LinkBuilder Multi Services Hub and an ATM switch (NW, July 5, page 8).

"Besides the resale agreement, details on how we will work together have not been completely finalized, but there is a possibility we could do some joint development work on new products," said Janice Roberts, vice president of marketing. "There is also a possibility we could add ATM partners in the future."

Fore already has a reseller deal with Cabletron Systems, Inc., a 3Com rival.

With the announcements, Fore has laid the groundwork to maintain its leadership role in the ATM LAN market, according to analysts. "If Fore can get Sprint to distribute its products as CPE as well as use 3Com to get into different accounts and push its switches through indirect channels, it could make nice strides in the market," said Todd Dagres, vice president of data communications at The Yankee Group, a consultancy in Boston.

"The company, if it's lucky, will do about \$20 million this year, which isn't a very big number," Dagres said. "But it only did about \$4 million last year, and that's a pretty good ramp in one year."

©Fore: (412) 967-4040.

## ATM takes center court

Although INTEROP's official technology showcases have been discontinued, vendors have taken it upon themselves to coordinate these affairs, and Asynchronous Transfer Mode (ATM) will undoubtedly be the technology with the most visibility.

Pacific Bell's Data Communications Group, MCI Communications Corp., Sprint Corp. and WilTel will demonstrate interoperability of ATM-based local exchange and interexchange networks. Using DS3, complex image files and video will be sent across permanent virtual circuits via ATM switches from Newbridge Networks, Inc., Fore Systems, Inc., NEC Corp. and TRW, Inc.

Fore, meanwhile, will be leading another effort from its booth that is being billed as the largest ATM demo to date. The event will feature interoperability among 16 vendors and a range of gear, including ATM switches, workstation adapters, hub interfaces, test equipment, data service units and wide-area DS3 services.

Vendors involved are Cabletron Systems, Inc., Digital Link, Inc., Fore, GTE Labs, Hewlett-Packard Co., HP's Broadband Testing division, InSoft, Inc., MCI, Newbridge, Pacific Bell, Parallax Graphics, Inc., Sprint, 3Com Corp., TRW, Wellfleet Communications, Inc. and WilTel.

Not to be outdone, SynOptics Communications, Inc. will counter rival Fore with its own demo that includes Hughes LAN Systems, Inc., Network Equipment Technologies, Inc., Retix and Sun Microsystems Computer Corp.

BY SKIP MACASKILL



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# AT&T set to announce LAN internet pack

BY BOB WALLACE

San Francisco

AT&T is expected to launch a local-area network interconnection service at the INTEROP '93 conference here this week called Accuwan.

The packaged offering will include dedicated network services, LCS200 routers from Wellfleet Communications, Inc., support services and network management, according to an analyst briefed by AT&T.

Private-line Accuwan packages, to be offered under customer-specific contracts, are designed to complement rather than replace AT&T's InterSpan Frame Relay service, a switched offering for LAN interconnection.

"Accuwan will be especially appealing to users that need to link LANs but don't want to handle network design, equipment acquisition, network construction and maintenance,"

said Rosemary Cochran, a principal with Vertical Systems Group, a Dedham, Mass., consulting and research firm.

AT&T admitted that it would announce a LAN interconnection service here but would not comment further.

Sources said that with Accuwan, AT&T will provide the public router offering, dedicated lines ranging in speeds from 56K to 1.544M bit/sec as well as network design, installation and maintenance services.

Cochran said AT&T will handle maintenance of the service and products from a remote network management site. □

# SMC offers WAN path for switching hub

BY SKIP MACASKILL

San Francisco

Standard Microsystems Corp. (SMC) this week will extend the reach of its intelligent switching hub with an interface that enables users to link hubs over a high-speed wide-area link.

SMC will complement that offering by adding Novell, Inc. Internetwork Packet Exchange (IPX) support to the Elite SwitchingHub (ES)/1's existing Internet Protocol routing capabilities. SMC is also planning a number of net management announcements, including support for two leading enterprise management platforms.

At the INTEROP '93 August trade show here, SMC will unveil the High Speed Serial Interface I/O Module (HIOM), a single-port module that enables the ES/1 to link local-area networks over public nets at speeds ranging from T-1/E-1 to T-3/E-3. HIOM supports one of two physical interfaces: a HSSI interface for high-speed connections up to 45M bit/sec or an RS-449 port for speeds up to 10M bit/sec.

"With HSSI capabilities, we can extend [ES/1's] switching features between LANs that are not accessible to each other via cable," said Lance Murrah, SMC's vice president of marketing.

Because the ES/1 has integrated routing capabilities, HSSI support allows users to route traffic across the wide area without the added expense of a stand-alone router. HIOM will be available in October for \$6,950. In conjunction with HIOM, SMC will add IPX support to its hub, allowing users to route both IP and IPX traffic locally as well as across the wide area.

"IPX support in the ES/1 is an essential piece we needed to add because Novell is the most dominant environment," said Bob Gohn, product marketing manager for the hub.

SMC will further widen its routing support by the first quarter of 1994 when it adds Digital Equipment Corp. DECnet Phase IV and V, as well as Open Systems Interconnection routing protocols to the mix.

IPX will be available in November. All new ES/1 units will ship with the capability, and existing users can receive a free software upgrade.

In addition to the ES/1 enhancements, SMC will extend its Unix-based EliteView net management software with two new applications. EliteView/NV and EliteView/OV will let users of IBM's NetView/6000 and Hewlett-Packard Co.'s OpenView, respectively, configure, monitor and control all ES/1 hubs on a net. Both applications will be available in October and cost \$2,950 each.

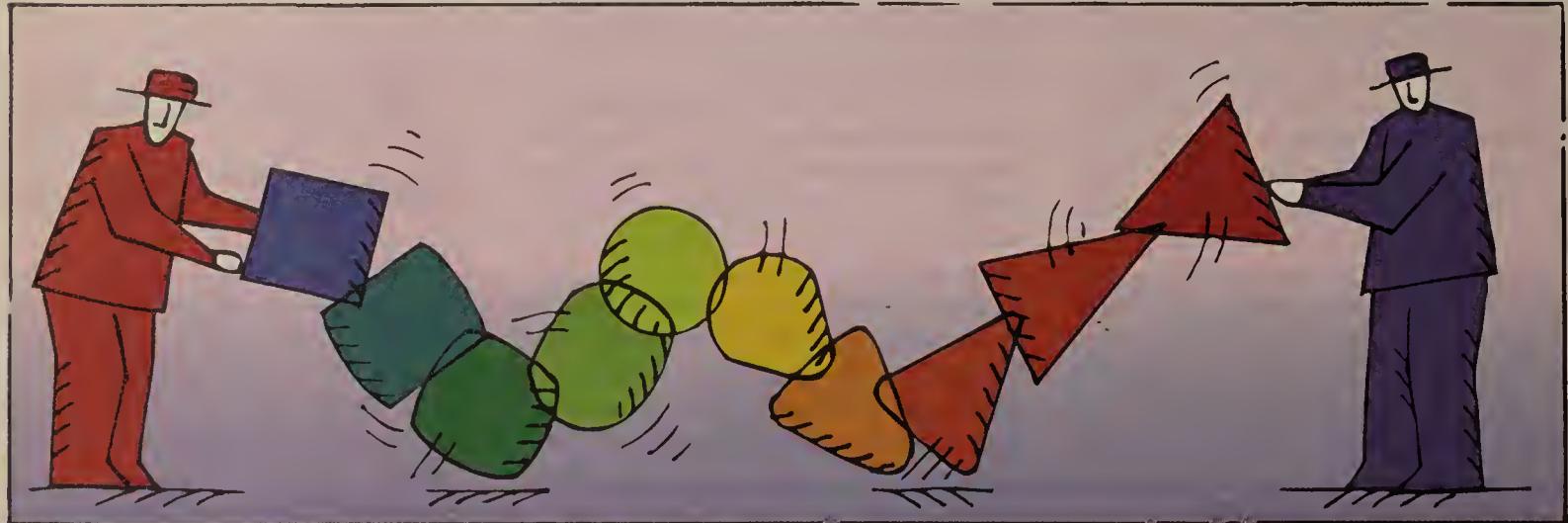
SMC will also announce EliteView support for Microsoft Corp.'s Dynamic Data Exchange (DDE), a standard developed by Microsoft that allows Windows applications to swap data.

The technology supports the creation of a link between DDE-compliant spreadsheet applications, such as Microsoft's Excel, and EliteView, allowing Simple Network Management Protocol data to be relayed to the spreadsheet.

DDE will be incorporated into the next release of EliteView, which is expected early next year.

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# SNA

Continued from page 1

dors themselves — including IBM — are hedging their bets by committing support for both APPN and Data Link Switching, the proposed standard for supporting the transmission of SNA data across TCP/IP nets.

Although no products currently exist to enable TCP/IP data to be carried across an APPN net, some SNA users have already staked their future SNA/LAN internetworking strategy on APPN, including United Parcel Service of America, Inc. (UPS) in Mahwah, N.J., and Canada Mortgage and Housing Corp. in Ottawa.

## APPN BELIEVERS

UPS is on a clear migration path to a full-blown APPN network and is currently in the midst of a major net overhaul to transform its hierarchical SNA network into a modern peer-to-peer structure that can support LAN traffic as well as traditional terminal-to-host sessions.

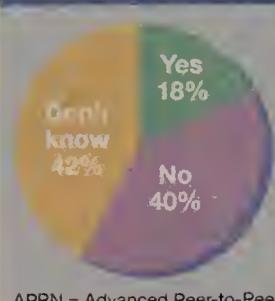
The UPS enterprise network consists of a traditional SNA net that runs parallel to an internet linking 1,200 LANs via IBM 6611 Network Processor routers and LAN bridges. By early next year, UPS expects to have a fully routed multiprotocol internet.

John Bruno, UPS telecommunications analyst, said UPS chose IBM routers precisely because the vendor could deliver APPN support faster than its competitors.

"We're looking for a flagship protocol that's robust enough to handle most of our application requirements," Bruno said.

"We're not naive enough to believe that any one protocol could do that. But we believe APPN can support a large majority of them," he added.

### Are you planning to use APPN?



APPN = Advanced Peer-to-Peer Networking

Figures are based on responses from 50 of the largest 1,000 U.S. firms surveyed in May.

SOURCE: FORRESTER RESEARCH, INC., CAMBRIDGE, MASS.

### TCP/IP OR APPN?

The question is which protocol — TCP/IP or APPN — will users ultimately choose to support their SNA/LAN integration strategy.

The majority of SNA users are expected to migrate to APPN, while large TCP/IP users with a smattering of SNA traffic will use an encapsulation method, according to Louise Herndon Wells, director of SNA internetworking at the Internetwork Technology Institute, a Milpitas, Calif.-based consultancy. "Where you're heading very often depends on where you came from," she said.

Tom Nolle, president of CIMI Corp. in Voorhees, N.J., agreed. "The user is going to take the least cost solution. If you're already committed to SNA and you have millions of dollars invested in Blue iron, the least cost solution is going to be APPN." □

based in Framingham, Mass. Without it, UnixWare users could talk only to other NetWare clients and servers, not to Unix clients or servers.

"I hope Univel includes TCP/IP connectivity in the next version [of UnixWare]," said Kenneth Orme, information systems specialist at the Communication Systems Division of Paramax Systems, based in Salt Lake City. "The problem with UnixWare is if you buy the single-user version, you don't get access to TCP/IP services and can't connect to a Unix host."

UnixWare is a shrink-wrapped version of Unix that runs on Intel Corp.-based machines. It was developed by Univel, a joint venture between Novell and Unix System Laboratories, Inc., which was recently acquired by Novell.

Novell has big plans for UnixWare, but to date, the product has not met with the success Novell had hoped it would have, according to analysts.

"From talking to people in the [reseller] channel, we estimate Univel's total shipments [of UnixWare] since February have been south of 25,000 copies," said Neal Hill, senior analyst at Forrester Research, Inc., a research and consulting firm based in Cambridge, Mass.

"Adding TCP/IP is a big plus in the Unix market; not having it was a definite drawback," said David Smith, director of Unix and advanced operating environments at International Data Corp., a research firm

APPN, unlike TCP/IP encapsulation, will enable SNA traffic to be transported in native mode across an internet, he added.

UPS expects to begin deploying applications using APPN by early next year.

Canada Mortgage and Housing is another early APPN pioneer. Three years ago, the company began using APPN to interconnect its IBM Application System/400s, enabling the devices to act as both APPN Network Nodes and APPN End Nodes. Network Nodes control routing and directory services and support End Nodes.

Earlier this spring, the firm became a beta site for IBM VTAM Version 4.1, which enables an IBM host to act as a Network Node. Using the new VTAM, it configured its host to act as a central APPN router to link AS/400s.

Ken Smith, systems software manager at Canada Mortgage and Housing, said he now plans to integrate his LAN traffic onto this backbone via APPN-capable routers.

Until then, the routers will continue to encapsulate SNA traffic in TCP/IP frames, with all the attendant overhead that entails.

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"They said they sold about 13,000 copies in the first six weeks it was available but since then haven't sold much more than 10,000 copies. UnixWare has definitely underperformed against their expectations," Hill concluded.

Part of the problem was positioning, analysts suggested. "Novell originally focused UnixWare on the desktop to counter NT," Hill said. "But as Microsoft shifted its focus to the server side, Novell realized that was where UnixWare would be more successful in the long term, as well."

Users have expressed confusion about UnixWare's positioning and agree that lack of high-end features — such as symmetric multiprocessing (SMP) support, which Windows NT will provide — could keep UnixWare out of many accounts.

"We're looking at Unix on Intel to be a database server but won't consider UnixWare until they bring out a multiprocessing version of the product," said a net executive at a large New York bank who requested anonymity. "Today, we're focusing on Unix shipping on multiprocessing boxes."

"People look for SMP, even if it's just on a checklist," IDC's Smith added. Without SMP, Univel will be shut out of high-end purchases, he said. □

# Work flow

Continued from page 1

offering. However, sources said IBM could make an announcement about the work flow system as soon as next month.

"IBM has to make this work," said Scott McCready, a principal at International Data Corp./Avante Technologies, Inc., a Framingham, Mass., market research firm. "Work flow represents the best and only vehicle for IBM to transform itself from a computer company to the leading provider of software and business automation solutions."

IBM last week demonstrated another key component of its work flow strategy, a new OS/2 2.0 product called Workflow Manager, which was developed by IBM Federal Systems Co. separately from the Programming Systems project.

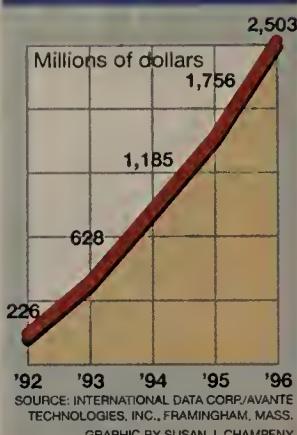
Also in IBM's work flow portfolio is Image-Plus, which features built-in work flow capabilities, and a work flow design tool dubbed the Enterprise Process Management facility, which the IBM Consulting Group uses to help companies in reengineering business processes.

IBM has also established relationships with work flow vendors Knowledge Information Center, a division of UES, Inc. in Dayton, Ohio, and Staffware in the U.K. And IBM recently spearheaded the formation of the Work Flow Management Coalition, an industry group designed to promote interoperability among multivendor work flow systems.

Edwin Vogt, director of software development in charge of IBM Programming Systems' laboratories here and in Austria, acknowledged that IBM's current work flow efforts might appear disjointed. But he said IBM has chosen to attack the work flow market from many sides to meet diverse user needs.

"We have a large opportunity here, considering our understanding of customers' business problems and the efforts we have under way in work flow

## U.S. work flow software forecast



SOURCE: INTERNATIONAL DATA CORP./AVANTE TECHNOLOGIES, INC., FRAMINGHAM, MASS.

GRAPHIC BY SUSAN J. CHAMPEY

technology," Vogt said.

Vogt described the technology being developed as "a generic system" that will serve as a platform on which users can build a variety of work flow applications.

It will consist of "build time" software that developers will use to define how work flow applications will route data among users. It will also have run-time software that executes processes on client and server systems in a production environment.

The build time software will enable developers to design work flow processes in a dynamic manner using a kind of simulation technique referred to by Vogt as animation. This will enable developers to feed various "metrics," such as the time it takes to complete a task, into the work flow design in order to discover potential bottlenecks, he said.

Once a process is designed, it is stored in an object database — Object Design, Inc.'s ObjectStore — within the work flow system on a server. The object-oriented design will enable processes to be changed on the fly and will make it easier for users to develop applications and for IBM to port the system to multiple platforms.

The system's object database would only contain process information, keeping it separate from the actual business data stored in relational and legacy databases. □

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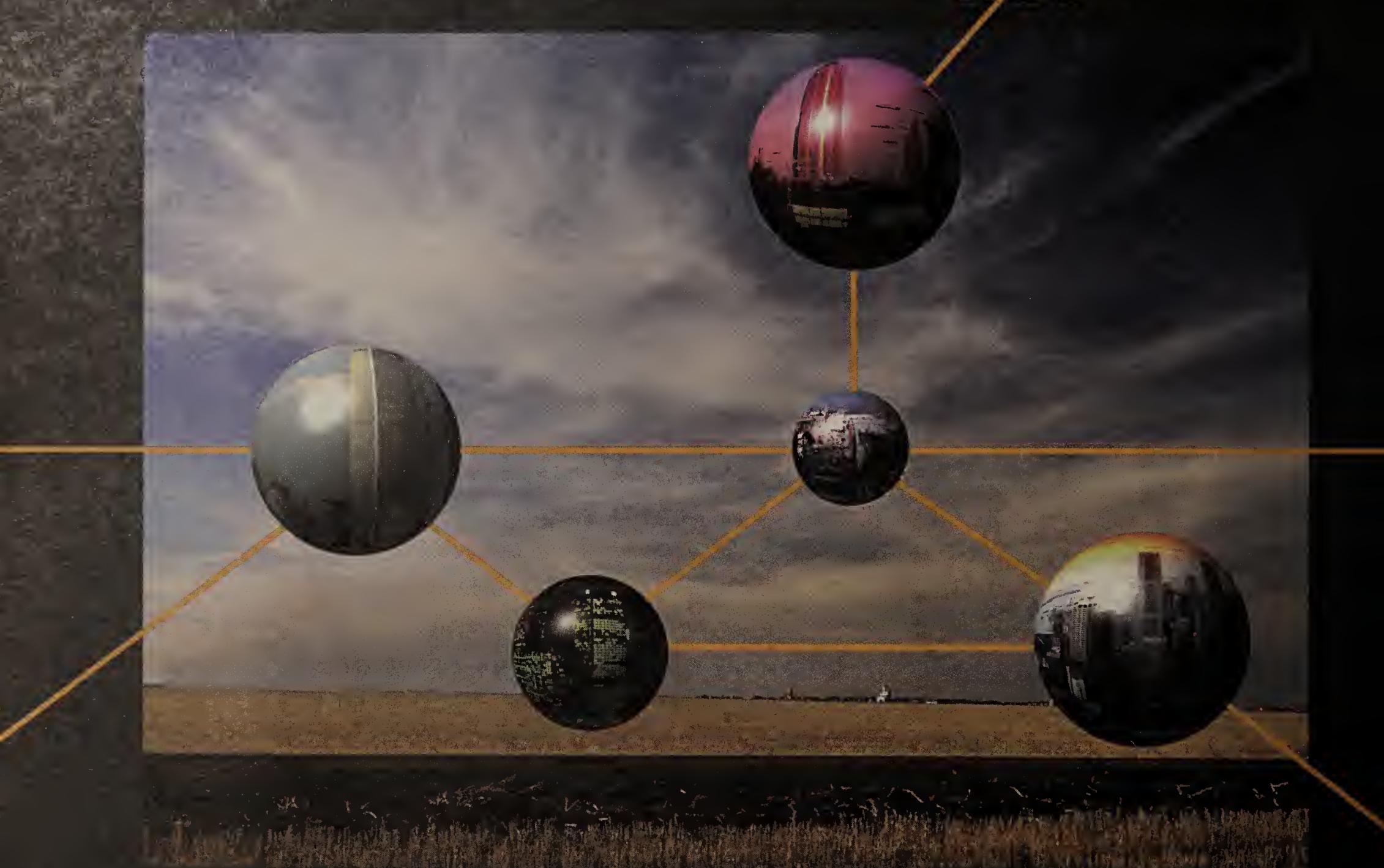
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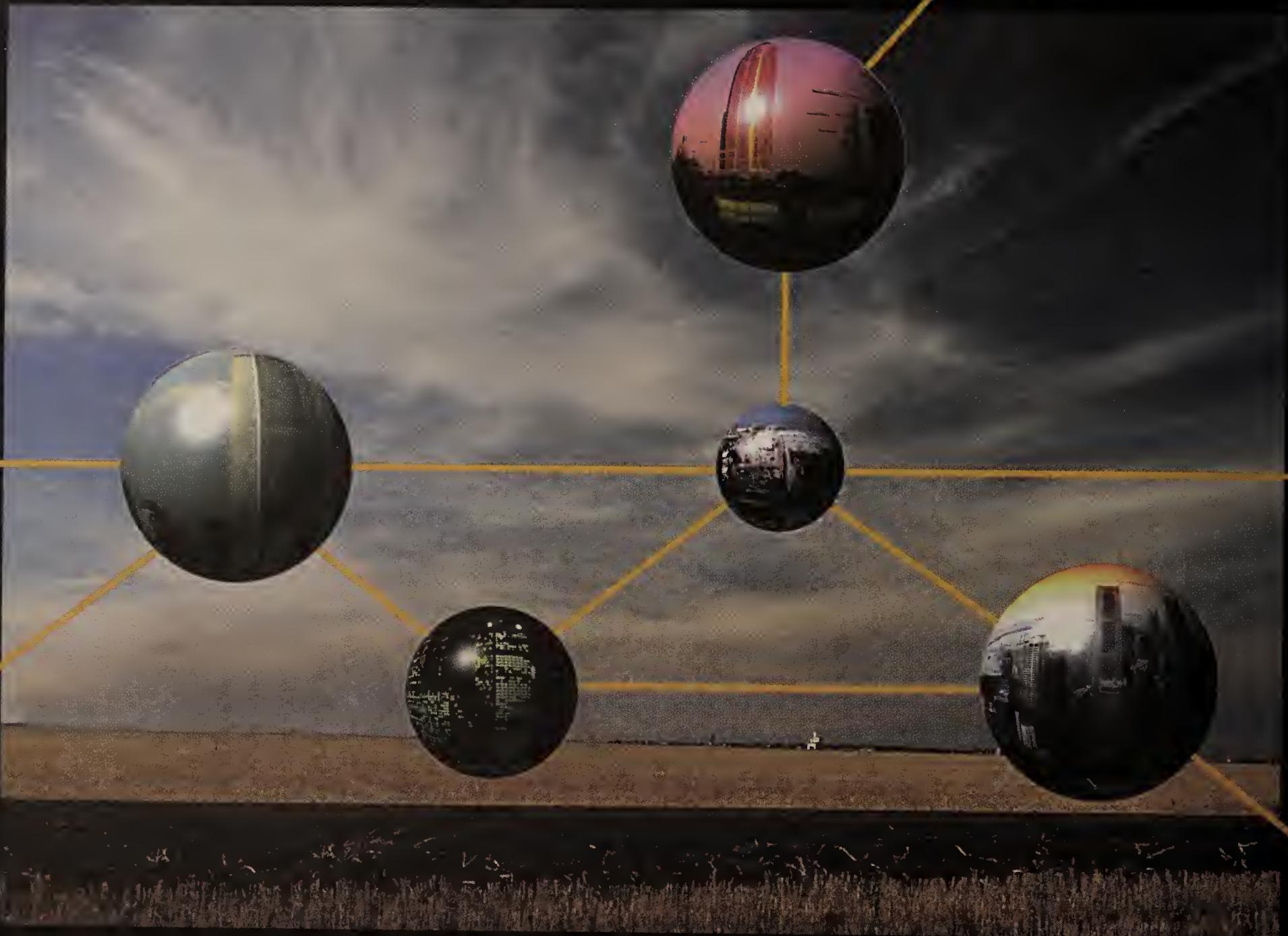
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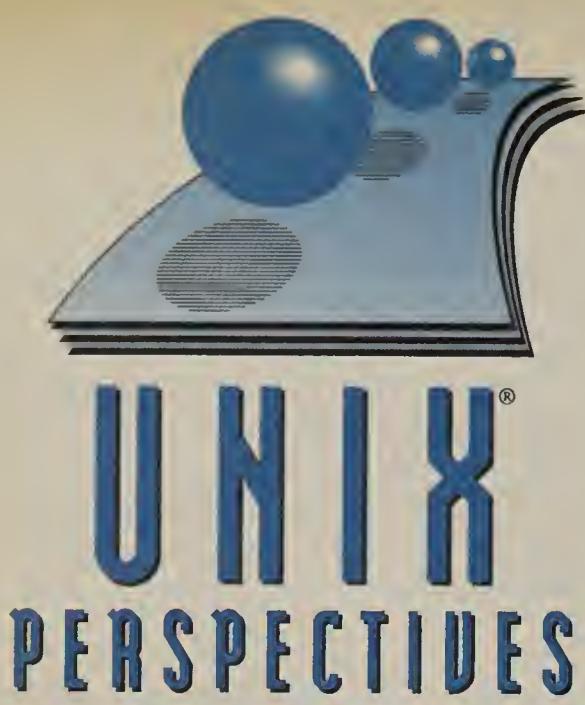
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### System Management

While companies are migrating from host-centric application architecture there is a very critical requirement to retain the rigor and discipline of traditional systems operations. This track will focus on the issues and solutions for distributed systems management which provide a "virtual glass house." Key topics will include distributed systems, client/server migration, and rapid deployment.

### Development Environment

One of the great strengths of distributed computing is the wide range of powerful application development tools available in the client/server world. This track will focus on tools available for developing mission-critical enterprise-wide solutions that will exploit the client/server architecture. Topics will include real-time open systems, middleware, distributed applications, and offshore deployment.

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